

AN EVALUATION OF THE RESOURCES OF
THE TALLCREE BAND

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AN EVALUATION
OF THE RESOURCES OF
THE TALLCREE BAND.

BEAVER RANCH INDIAN RESERVE NO. 163
TALLCREE INDIAN RESERVE NO. 173 and 173A

I N D E X

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Introduction

In June, 1967 the Regional Office of the Indian Affairs Branch in Edmonton commissioned the firm of Frank E. Price and Associates to carry out a Land Use Survey of the Reserves of the Tallcree Band. Subjects to be evaluated in this study are tabulated below:

1. A general description of the Reserve supported by maps and charts, by location, size, access, topography, lakes and streams, and existing land use.
2. An outline of the economy of the Reserve, and its relationship to the economy of the district in which the Reserve is located.
3. An inventory of the human resources by population, age groups, labour force, education and skills. A population forecast will also be provided.
4. An inventory of the physical resources of the Reserve, including lands suitable for agricultural purposes by soil types and land capability, forest resources, minerals, fish and wildlife, tourist development, industrial and commercial development, and opportunities for off Reserve employment.
5. A description of the community including housing, roads, services, and community planning and tenure.
6. The study, will in consultation with the Band and Branch staff recommend programs for the development and utilization of Band resources and will record any apparent impediments in the development of these resources.
7. Particular emphasis will be placed on recommendations for agricultural programs and the establishment of economic farm units, outlining the requirements for each in land, equipment, livestock, and suggesting suitable cropping programs.

It will be realized immediately that the scope of the study was much broader than would be implied by the term "land use study". The authors were in fact, asked to evaluate all of the resources of the Band and to recommend programs for development.

Resources available and potentially available both on and off the Reserve had to be determined and evaluated with respect to their usefulness to the Indian people.

The interests and needs of the Indian people had to be determined and programs outlined to meet these. In addition, these plans had to be extended into the future in terms of population growth. These needs were predicted to 1979.

Careful consideration had to be given to the development of the Reserve's major resource, agriculture and the cost/benefit structure defined. Consideration had to be given to other potential economic resources.

It was recognized quite early that the major future opportunities for Indian people lay outside of the Reserve, in the immediate district and more particularly in the larger region. For this reason, a major appraisal of the economy of census district 15 was undertaken to define the areas which will be useful to Indian people in the future.

It is believed that this will prove to be a most useful document for future planning.

The authors trust that they have met and indeed, surpassed their obligations.

SUMMARY

The principal elements of opportunity for members of the Beaver Ranch and Tallcree Bands are agricultural development of their Reserves and off-Reserve employment.

The Fort Vermilion area is largely an undeveloped frontier that has not, as yet, enjoyed a balanced growth pattern. The recent discoveries of oil in the Zama Lake and Rainbow fields have generated a sharp increase in non-Indian population, particularly in the High Level area. This infusion of people and increase in activity has not, as yet, involved a significant number of Indian people. Employment to date has been primarily limited to seismic line cutting and other activities related to oil exploration.

The growth of communities such as High Level has generated new interest in development of the agricultural resources of the area. The mayor and council of High Level have indicated that they will be undertaking a program to entice agricultural settlers to the area.

Should the agricultural resources of the area be developed, the economic pattern of the area will be altered to such an extent that employment opportunities of Indian people will be greatly enhanced. It can be projected that opportunities will be created through the need for road construction, new service industries, building construction and to some extent, land clearing and farm labor.

Employment opportunity will be largely off-Reserve.

If Indian people are to benefit from such development, educational programs should be undertaken now that will:

- (a) Prepare people psycologically for off-Reserve involvement.
- (b) Train people to fill the requirements of a new economy with particular attention to heavy equipment operators, mechanics, carpenters, etc.

The resources of the Reserves themselves cannot, either now or in the future, sustain the Indian population. It will be noted that the population projection predicts population growth that significantly outstrips the projected labor force. Increasing economic pressures will be created on this limited labor force and through this labor force, to government to increase support programs. Welfare dependency on an increasing scale could be the final result.

The Fort Vermilion area is somewhat unique in that it stands at the threshold of development. Its natural resource development will require people and skills. Indian people, if trained, could participate in this development. It must be emphasized, however, that training should start now, before development takes place, not after non-Indians have been brought in to fill the required jobs.

The economics of agricultural production in the Fort Vermilion area are critical. Larger equipment factors imposed by limited seeding and harvesting periods, higher transportation costs and the possible requirement of grain drying facilities,

creates a demand for greater capital inputs and reduces net returns significantly.

Based on long-term crop averages, and the conventional repayment schedules of borrowed capital, coupled with crop share lease arrangements, grain production would appear to be marginal. If agriculture is to contribute to the economic and social development of the Fort Vermilion area Indians, it must be predicated on a future oriented approach that recognizes the following factors:

- (a) A high degree of technological and management assistance and/or supervision will be required to achieve realistic productivity levels. Fertilizer and modern management techniques can and should, increase production levels.
- (b) Lease rates to the Band should be set so as to reflect realistically the need for assistance in the early years while at the same time, reflect a reasonable return to the Band for their resources. In this connection, a three year free period would be realistic and a \$1.50 per acre cash rent basis for the years following, subject to review every five years.
- (c) Loan repayment schedules should reflect an understanding of the need for a higher capital input in order to exploit the Band resources. We have used "The Alberta Farm Guide" depreciation basis of fifteen years while loans have generally been for periods of ten years. It must be accepted that a cyclical but reducing debt situation will occur with the operator(s) increasing their equity position over a long period of time.

Although the economics of agriculture are critical, agricultural development of the Reserves should be undertaken. In order to minimize the risk factors involved, it is our opinion that corporate farms should be the vehicle used. Lower capital inputs and better management control being the most significant factors.

An additional factor in favor of the corporate approach is that the unit could be a training vehicle leading to eventual off-Reserve establishment. The corporate structure offers opportunity for gaining experience, achieving equity holdings and gaining an element of independence and self-reliance.

We cannot over-emphasize the need for intensive technological and management assistance. No operations should be undertaken unless government is prepared to provide such assistance.

RECOMMENDATIONS:

Resource Development:

The Tallcree Band has in its possession, nearly 7,000 acres of arable land and probably over 14,000 acres should the land now held by the Alberta Government, obtained on their behalf. For the development of these resources, the following recommendations are made:

- (1) That the Beaver Ranch Reserve be given first priority for establishing farming enterprises. The soils of this Reserve are excellent. It has good accessibility and because of its location, the economics of production on this Reserve will be far more favorable than on the two Tallcree Reserves. Development on this Reserve will be even more favorable if the addition is granted. Secondly, the cost of the initial development of the land will be less if it is done on a large scale in one block as the Reserve permits.
- (2) The second Reserve to be developed should be the Tallcree Reserve No. 173. The arable soils here are productive and will be easier to manage than those of No. 173A. Better access into the Reserve should be provided, however. The costs of production on this Reserve will be high because of the added transportation of grain and supplies and therefore the cost attributed to the land (rent to Band) should be a lower proportion than on the Beaver Ranch Reserve.

RECOMMENDATIONS

Agricultural Development

1. It is recommended that the agricultural resources of the Beaver Ranch Reserve No. 163 and The Tallcree Reserve No. 173 be developed as soon as possible.**
 2. Recognizing the critical economic and production factors involved, it is recommended that development be based as follows:
 - (a)* Farms developed be of the corporate or small group nature so as to minimize the risk factors as much as possible.
 - (b) That the unit so developed be large enough to constitute an "Economic Unit", recommended minimum size, 2,000 acres.
 - (c) That land be cleared in units large enough to correspond to the farm unit size.
 - (d) That no cash rental or lease payment be required for a period of three years. Cash rent payments to the Band beginning in the fourth year should be based on \$1.50 per acre with automatic review every five years.
 3. The Department of Indian Affairs must recognize the need for intensive technological and management assistance and should be prepared to provide that assistance for such a period to be determined by the progress of the units.
- * By reason of the critical nature of agricultural production and economics we do not, at this time, recommend the development of individual farm operations.
- ** Further soil testing is required on Reserve No. 173A to determine degree of acidic soil condition before development can take place.

EMPLOYMENT AND TRAINING

In view of the fact that the resources of the reserves themselves will not be sufficient to support all of the Indian population, and in recognition of the growth and expansion in the area at large, it is recommended that,

- (a) Intensive programs of upgrading and skills development be undertaken now to prepare Indian people for participation in the economic expansion of the area.
- (b) That provision be made for close liason between various agencies involved with respect to training and relocation and particular efforts be directed to ensure that Indian people are fully acquainted with future opportunities, training programs and relocation assistance.

SOCIAL DEVELOPMENT

It is recommended that consideration be given to an expanded program of community development and adult education designed to create a greater awareness and understanding of the unique opportunities presented by an expanding economy.

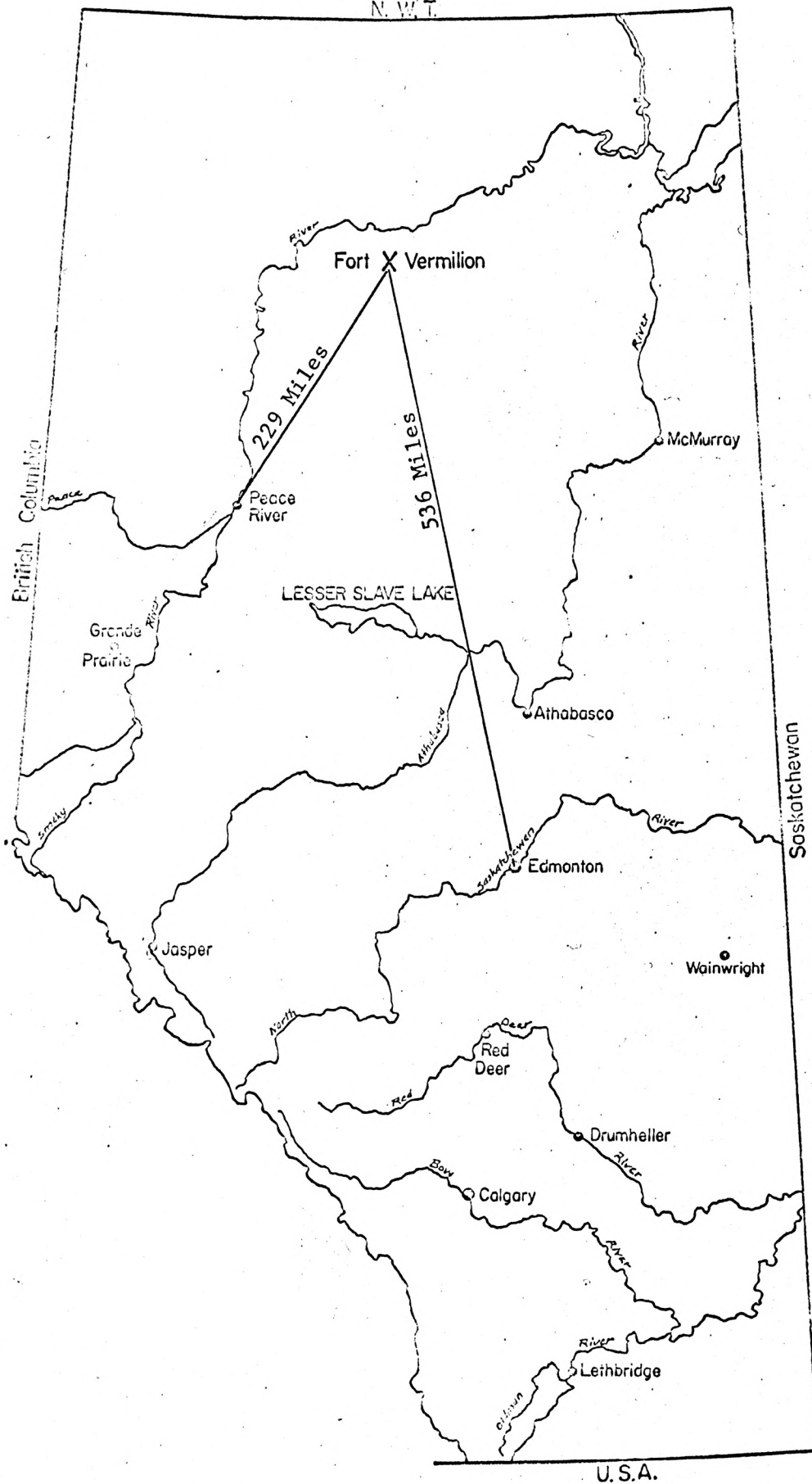
Both the Indian people and the agencies involved should be prepared to exploit to the fullest, the new opportunities as they are created.

In this connection, it is recommended that consideration be given to the establishment of a development council made up of representatives of the Bands in the area and Government agencies involved for the purpose of:

- (a) Planning and developing programs for the development of agriculture.
- (b) Discussing and planning upgrading and skills development programs.
- (c) Discussing with and advising Indian people on employment opportunities in the area.

KEY MAP

N.W.T.



An Evaluation of the Resources of the Tallcree Band

Beaver Ranch Reserve No. 163

Tallcree Reserve No. 173

Tallcree Reserve No. 173A

General Description

History and Location:

The Tallcree Band was one of the Bands which participated in the signing of Treaty No. 8, on June 21, 1899. The Reserves were not established until sometime later with the first one being the Beaver Ranch Reserve No. 163 on June 16, 1916. The remaining two Reserves Nos. 173 and 173A, were established on July 11, 1924.

The Beaver Ranch Reserve is located on the banks of the Peace River, some 15 river miles downstream from Fort Vermilion and in Townships 108 and 109 and in Range 11 west of the 5th meridian.

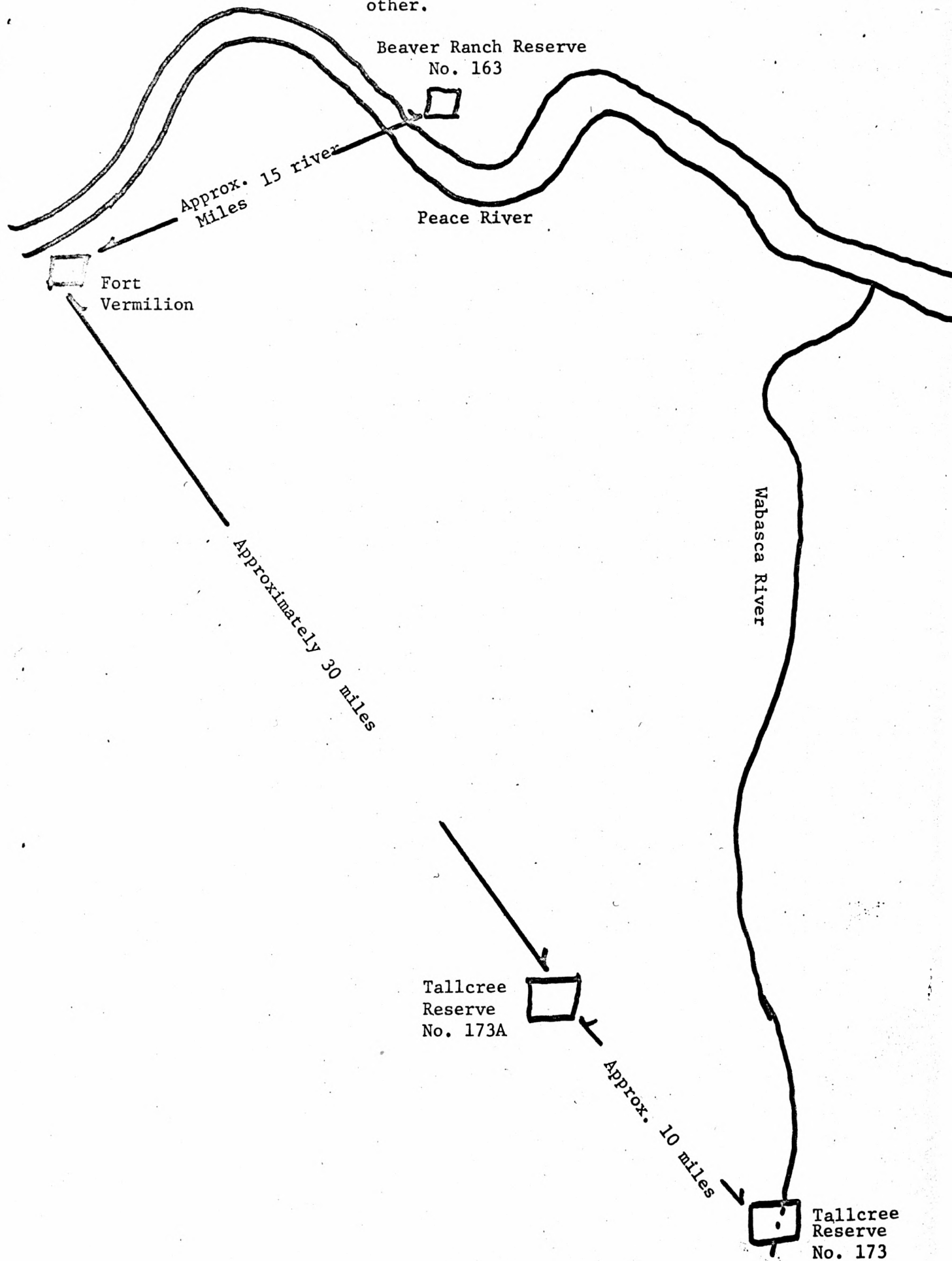
The two Tallcree Reserves, 173 and 173A, are found southeast of Fort Vermilion - 173A approximately 30 air miles, and 173 an additional 10 miles in the same direction and situated on the banks of the Wabasca River. Reserve No. 173A is located in Township 104, Range 10, west of the 5th meridian, while Reserve No. 173 is found in Township 102 and 103, Range 9, west of the 5th meridian.

Size:

Beaver Ranch - 2080 acres. An additional 10,078 are

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RESOURCE DEVELOPMENT CONSULTANTS

Diagram showing the location of the Reserves
of the Tallcree Band in relation to each
other.



presently under negotiation on behalf of the Band as an addition to the Reserve. This addition will join the present Reserve on three sides.

Tallcree Reserve No. 173 - 1,594.92 acres distributed along the Wabasca River and on both sides of it.

Tallcree Reserve No. 173A - 5,530.95 acres.

In total, the Tallcree Band has 9,205.87 acres in Reserves and a possible addition of another 10,078 acres.

ACCESS:-

At the present time, only the Beaver Ranch Reserve has adequate access. Recently a graded, gravelled road has been constructed joining the Beaver Ranch Reserve with highway No. 58 running eastward from High Level. There is a road under construction, however, that will pass through the Tallcree Reserve No. 173A and will cross the Wabasca only a few miles from Reserve No. 173. (The road now under construction will follow the approximate course of the previous wagon road but will be graded and gravelled). This road, under construction, is for the purpose of providing access to the large timber areas found in the vicinity of the Tallcree Reserve No. 173. Previous to the construction of these roads, the only access to any of the three Reserves was by horse, dogs in the winter, and tractor. There is no small craft airstrip on any of the three.

TOPOGRAPHY:

The topography of the Beaver Ranch Reserve is fairly uniform with a gradual slope to the south and east towards the Peace River. In the vicinity of the river, some areas have small undulations caused by the action of the river during flooding. The land area, being considered for the enlargement of the Reserve, is similar in topography although part of this area is occupied by a large, flat "prairie".

Tallcree Reserve No. 173 - located on the banks of the Wabasca River, has two different forms of topography - that formed by the erosion of the river forming a river valley with a steep escarpement on each side, and the flat, level river flats formed by alluvium which the river has deposited. The escarpement has been eroded over the years and in places is steeper than in others, depending on the soil texture and the proximity to water channels.

The Tallcree Reserve No. 173A, known as the "Tallcree Prairie", is also very flat and uniform but slopes gradually downward to the north west evidenced by the flow of surface water, toward the Jackfish and Bear Creeks. The southern end of the Reserve slopes upward toward the Buffalo Head hills which begin approximately five miles to the south of the Reserve. The slope over the entire Reserve is barely noticeable to the eye.

Lakes and Streams:

There are no lakes on any of the three Reserves although

the Beaver Ranch and the Tallcree Reserve No. 173 are situated on the banks of the Peace and Wabasca Rivers. A tributary of the Bear Creek originates in the Tallcree Prairie No. 173A. The level of water in these rivers and creeks fluctuates according to the year and the season. The tributary of the Bear Creek that originates in the Tallcree Reserve No. 173A often dries up in dry seasons.

EXISTING LAND USE:

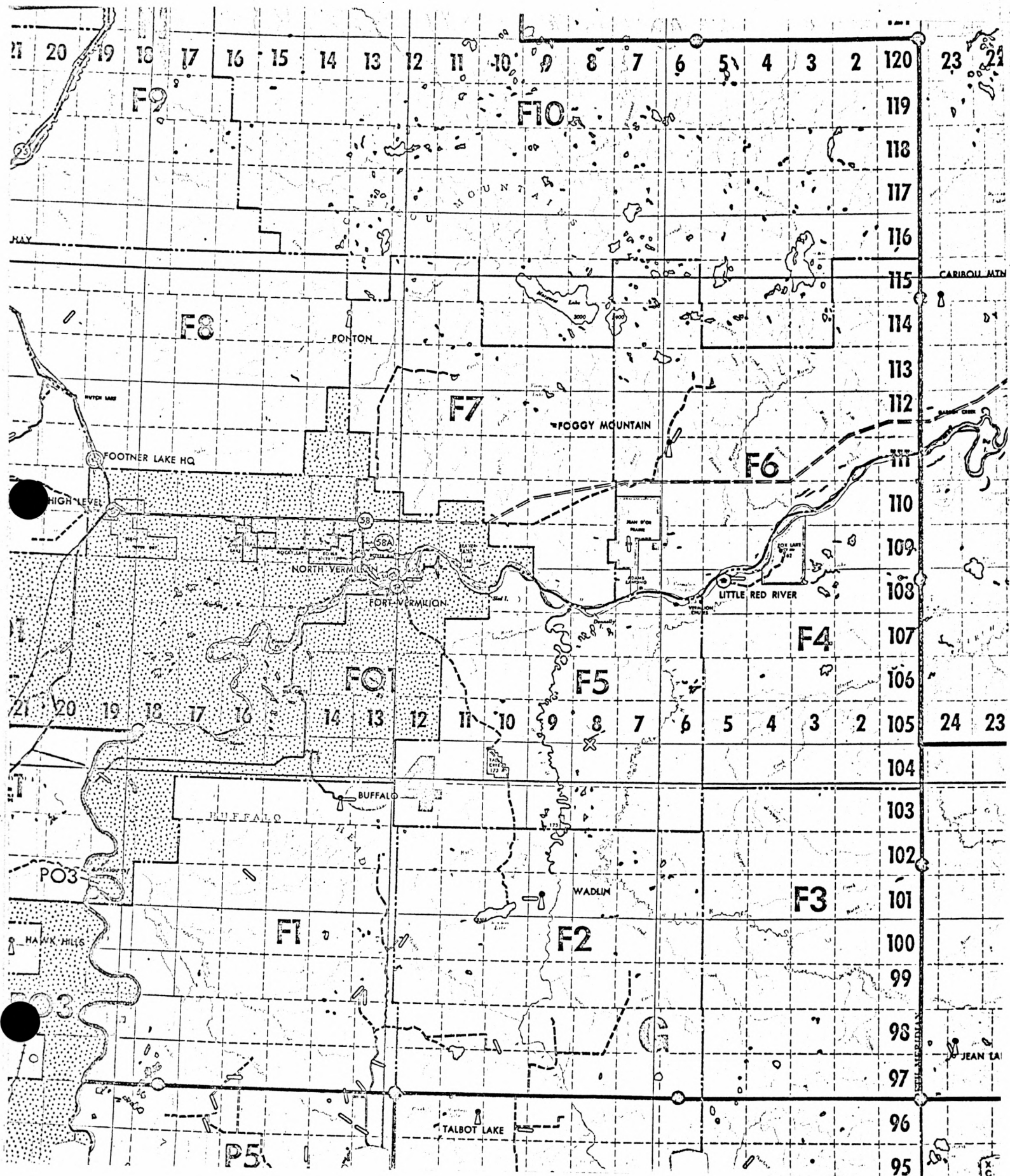
Land use has been negligible on all of the three Reserves. On the Beaver Ranch Reserve, there has been one family living part time but the majority of the time in Fort Vermilion. There is only a garden plot broken. The rest of the land is not being used for anything, although there is a story existing that tells about a non-Indian who used to pasture his cattle on the Reserve many years ago. At present, there is a sawmill operating on a custom basis that is harvesting some of the small amount of timber that is found on the Reserve.

Some of the land on the Tallcree Reserve No. 173 is being used to sustain approximately twenty head of cattle and several horses. The river flats have been used for haying while the cattle have been pasturing the wooded area on the Reserve and around the Reserve. Recently some of the river flats have been broken for the purpose of cultivation. There are several families living on the Reserve who have been growing vegetables for their

own use. Some hunting and trapping is being done on, and around the Reserve and so the land has had a productive use in providing a habitat for game.

The Tallcree Prairie Reserve No. 173A has had no real use since there has been no one living on it. It is known, however, that a non-Indian used to put up hay and pasture on some of the land area several years ago. In the past year, however, there has been a housing project on the Reserves so that now, six new houses have been constructed. These new houses occupy a site along the road now under construction, which passes through the Reserve.

MAP OF AREA SHOWING LOCATION OF INDIAN
RESERVES IN RELATION TO FOREST MANAGEMENT UNITS



THE ECONOMY OF THE RESERVE AND ITS RELATIONSHIP TO THE ECONOMY
OF THE DISTRICT

The Reserves:

The economy of the Tallcree Reserve is indeed small - as most of the people do not live on the Reserves. The Reserves, however, have been producing a revenue which adds to the Band funds and which can be drawn upon by the Band.

The largest incomes of the Band are from oil and gas leases and from trapping. There are no agricultural leases on any of the Reserves and only a small sawmill operating on the Beaver Ranch Reserve on a custom basis. All of the Reserves are located in areas where, until the present, there has been a good supply of game (especially the Tallcree Reserve No. 173) and therefore this activity has been important to the families who live on the Reserves and to those families which manage trap lines from Fort Vermilion.

There are two cattle owners on the Tallcree Reserve No. 173 who own approximately 20 head. This has not been a commercial enterprise as access to and from the Reserve has been very limited. The surplus livestock has been slaughtered for home and local consumption.

The following is an estimate of the revenue that the above factors have been producing for the Reserves*.

*Source - Indian Affairs Statistical Report file No. 775/41-1

Oil and Gas lease (no producing wells)	\$6,522
Wildlife (20 trappers)	\$2,500

The sawmill at Beaver Ranch is producing approximately 154,000 F.B.M. annually which has been used for local construction by the Band.

These earnings have been subsidized by social allowance payments to a total of \$19,000. (There was an average of 110 people per month on emergency welfare and 36 people on permanent welfare - 1966/67).

Estimated total income (1966-67) = \$28,022.

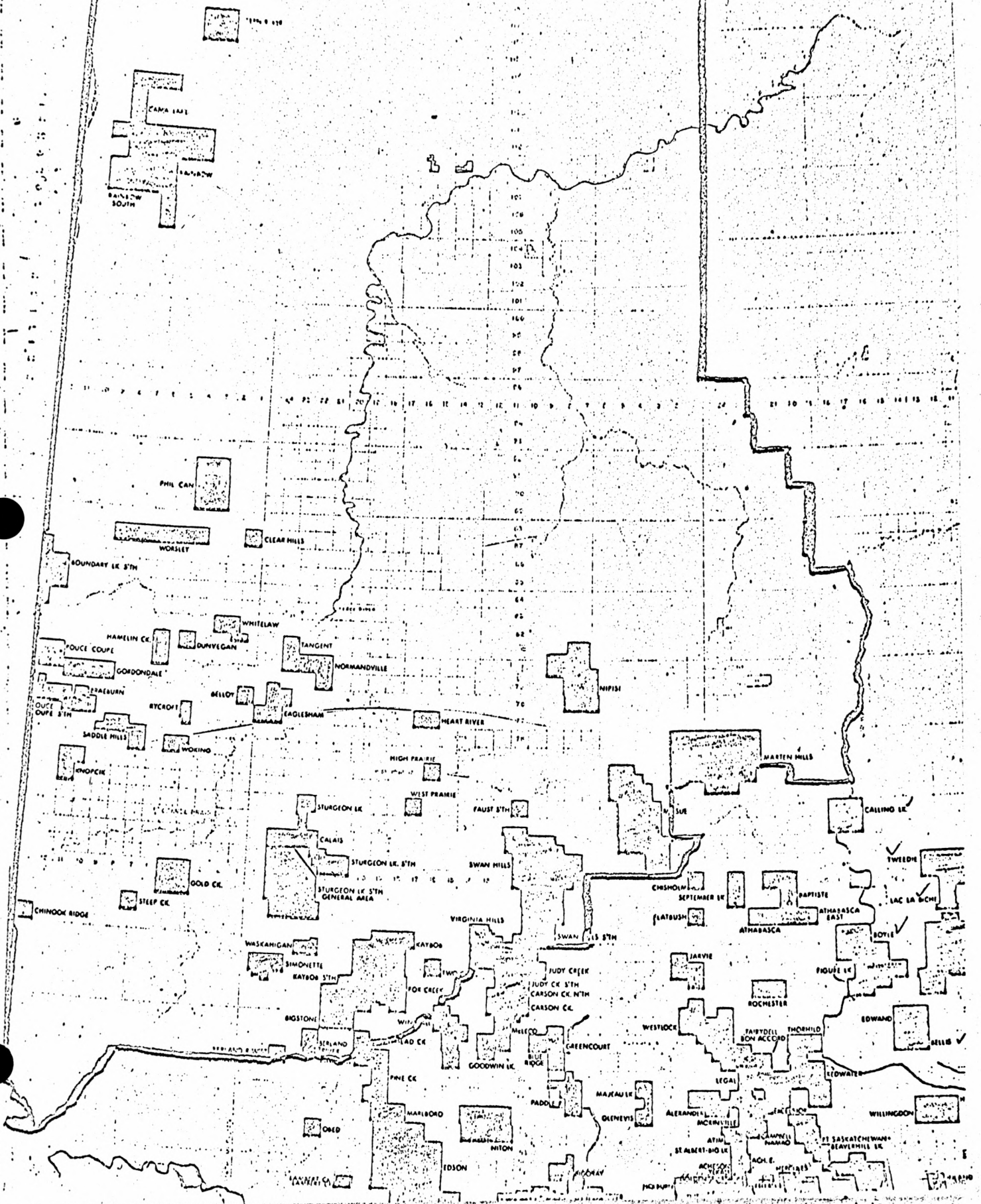
It should be noted that since 129 people out of 179 (1967) were living off the Reserves and presumably settled in the area around the hamlet of Fort Vermilion. This fact, combined with the fact that the per capita income of the revenue coming to the Reserve is approximately \$156/year, leads to the conclusion that the incomes of the people must be supplemented by off-Reserve earnings. This means that there is a dependence on the part of the Tall-cree Band on the economy of Fort Vermilion. area for employment.

Off Reserve Employment:

The exact earnings of the people in this category are not known. A brief discussion of the possible sources of income is presented below.

Oil and Gas Fields - This is probably one of the largest sources of off-Reserve income as it is known that individuals of the Band have been involved directly in contracts for seismic work in the Rainbow and Zama Lake oil fields.

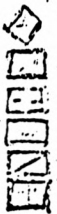
15; 1966



INDUSTRIAL MINERALS
IN
CENSUS DIVISION 13
1901
CODE

ALUM
BENTONITE
GYPSUM
IRON
PUMICITE
SILICA SAND

SALT BASIN LIMIT - -



FORT
VERMILION

CLEAR HILLS

SALT BASIN

PEACE RIVER

MARTIN
MOUNTAIN

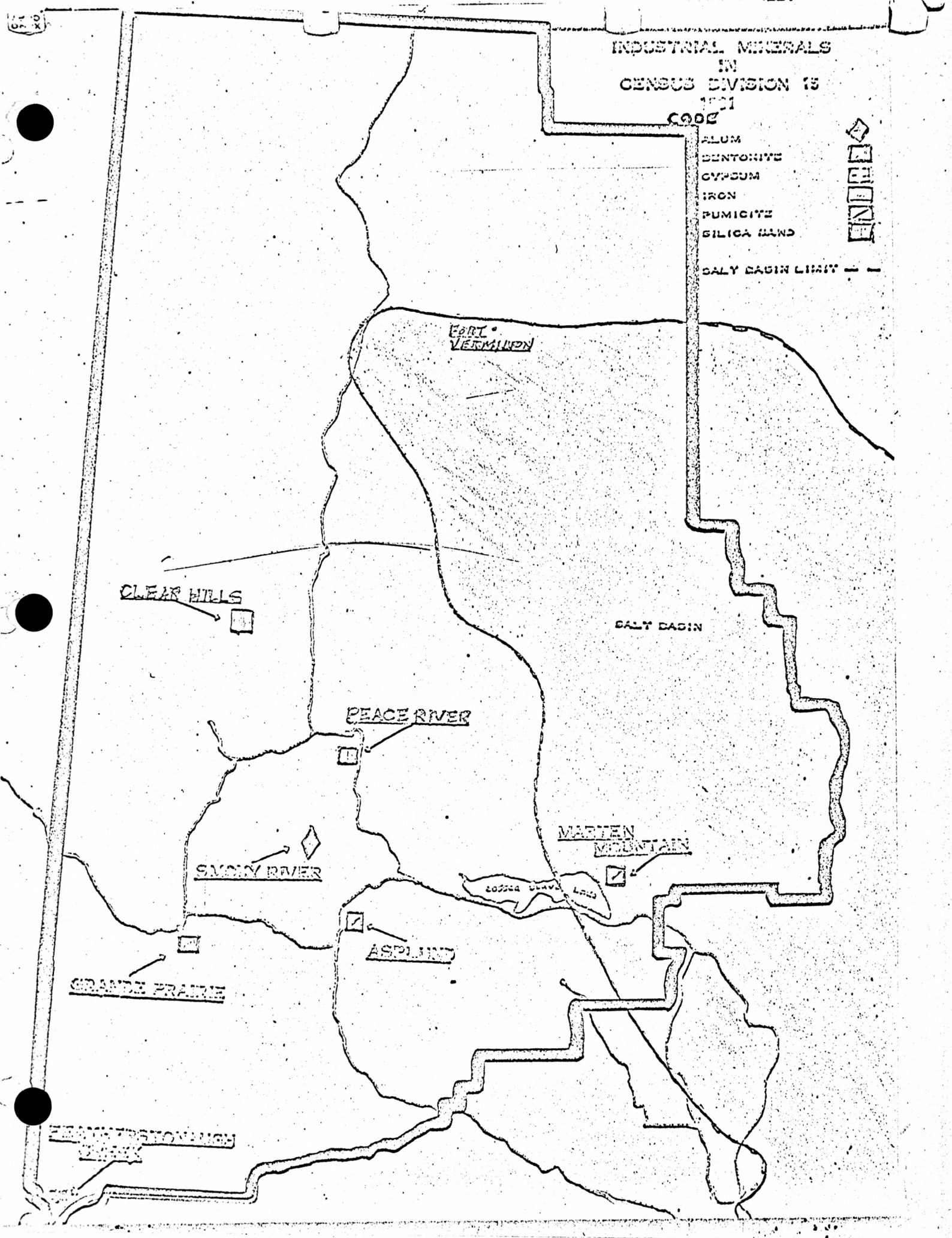
SAGINAW RIVER

LOOSE CREEK

ASPLUND

GRANDE PRAIRIE

FRANKFORD CREEK



THE ECONOMY OF THE DISTRICT

The economy of the district surrounding the Tallcree and Beaver Ranch Reserves has been influenced tremendously by two factors:

- (1) The discovery of the Rainbow and Zama Lake oil fields.
- (2) The development of the Alberta Northern Railway to Pine Point.

Economic Impact

The discovery of the Rainbow and Zama Lake oil fields has caused an influx of capital and people into the area that has literally created the basis for the incorporated town of High Level.

Population

High Level	708 - 1966 (A.B.S.)
	1,551 - Jan. 25, 1967 town survey
Fort Vermilion	631 - 1956 (A.B.S.)
	768 - 1961 (A.B.S.)
	759 - 1965
	(D.B.S. census by township)

Fort Vermilion Area

(Tps. 104-108 Rgs. 12-16 1965 D.B.S. 2,510
Census by townships south and east of
Peace River)

Improvement District 147	1,589 - 1951
(A.B.S.)	2,500 - 1956
	3,189 - 1961
	3,826 - 1966

The influx of people and the increase in purchasing power they bring has created a new demand for goods and services and consequently High Level is becoming a trade centre of the area. This focal point for the supply of goods and services has created a residential centre especially for people who are employed in the oil fields. The increase in the residential sector has further increased the demand for labour and capital in the construction field.

The development of the Northern Alberta Railroad to Pine Point has provided the area with a more inexpensive form of transport than was previously supplied by trucks. The impact of this is significant especially to the farming community since it means that grain can be shipped out at nearly 20¢ per bushel cheaper than previous. This factor has enhanced economic production of grain in the area and will undoubtedly help to expand the agricultural base. There are three grain elevators now located at High Level.

Agriculture in the area is growing at an increasing rate. In 1961 there was 100,000 acres of farm land, about 42,000 of it improved. Estimates in early 1966 show that the improved acreage had almost doubled while the total acreage of farmland was almost four times that of 1961.

CONDITION OF FARM LAND 1961 - (A.B.S.)

Improved Land (Acreage)

	<u>Total</u>	<u>Undercrops</u>	<u>Summerfallow</u>	<u>Pasture</u>	<u>Other</u>
I.D. 147	42,234	33,669	6,577	2,341	647

Unimproved Land

<u>Total</u>	<u>Woodlands</u>	<u>Other</u>
62,577	18,479	44,098

Source: "Statistical Analysis of Census Division #15 - A.B.S."

1966 - Improved Land 110,000 acres

Total acreage of farms 430,000 acres

Source: Research Report 1962 - 1964

Experimental Farm, Fort Vermilion

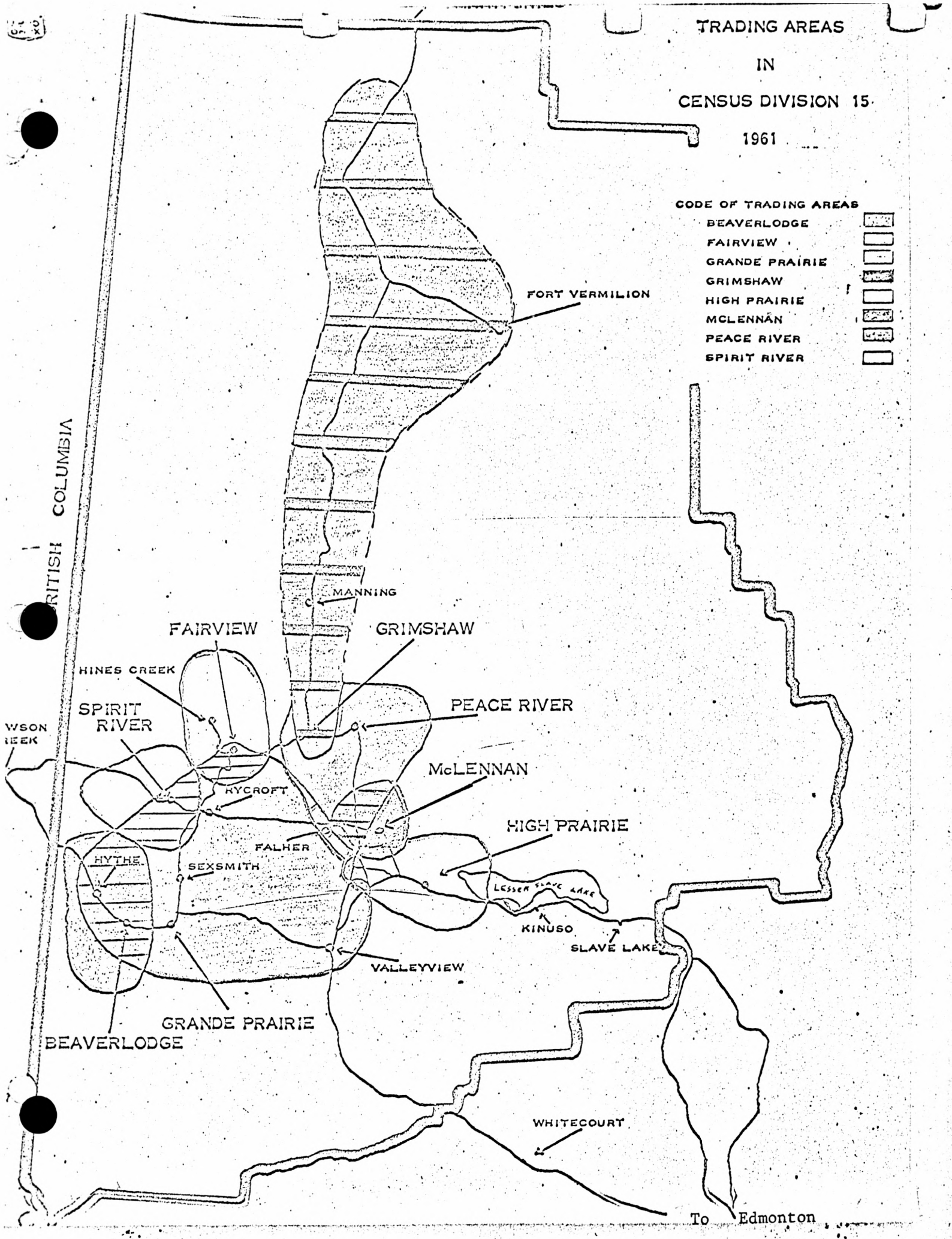
Note: It should be noted that the 1966 figure is an estimate.

It should be noted that much of the land in the Fort Vermilion area has recently become available for settlement under the Homestead Act and that there is still a large potential area of arable land that will become available in future years. It should also be noted that the parcels of land released under the act have been too small in relation to the scale requirements for commercial farming and that this factor alone has undoubtedly affected the profitability of farming ventures in the area. (The regulations were changed in 1966 to allow a total of one full section of land to each.

TRADING AREAS
IN
CENSUS DIVISION 15
1961

CODE OF TRADING AREAS

BEAVERLODGE	
FAIRVIEW	
GRANDE PRAIRIE	
GRIMSHAW	
HIGH PRAIRIE	
MCLENNAN	
PEACE RIVER	
SPIRIT RIVER	



BRITISH COLUMBIA

WSON
NEEK

To Edmonton

NUMBER OF FARMS BY ACREAGE - 1961

	All Farms	Under 3 acres	3-9 acres	10-69 acres	70-239 acres
I.D. 147	280	1	1	2	73
	240-399 ac.	400-559 ac.	560-759 ac.	760-1,119 ac.	1120-1599 ac.
	123	31	27	13	8
	1600-2239 ac.	2240-2879 ac.	2880 acres or more		
	-	1		-	

Source: "Statistical Analysis of Census Division #15"- A.B.S.

The lumbering industry in the Footner Lake Forest Reserve is playing a greater and greater economic role. As roads are built into the more remote areas, new timber stands are accessible and new leases can be sold. There is still a large potential of the timber resources remaining unexploited.

Trade

Prior to the development of the MacKenzie Highway and the Pine Point railroad, trade was centered very much with the towns to the south - Grimshaw, Peace River, and Manning. However, with the development of these transportation routes, these towns have become less essential and much of the increase in trade has been absorbed by High Level. Indeed, in view of the decrease in population of Fort Vermilion, it would appear that the trade may be shifting even from Fort Vermilion to High Level.

TRADE STATISTICS
CENSUS DISTRICT 15 - 1965

	<u>Area</u>	<u>Location</u>	<u>No. Firms Reporting</u>	<u>Total Sales Volume</u>
I.D. 147	24	Fort Vermilion	20	\$ 887,242.
		High Level	18	1,365,948.
		Other Locations	9	395,990.
		Total	47	\$2,649,180.
Grand Total Census District 15			1,149	\$109,882,000

VALUE OF SALES IN CENSUS DISTRICT 15

	<u>Retail</u>	<u>Wholesale</u>	<u>Service</u>
1965	\$72,308,000.	\$26,121,000.	\$8,785,000.

VALUE OF SALES IN SELECTED CENTRES

IN THOUSANDS OF DOLLARS IN

CENSUS DISTRICT 15 1965 - 1966

	<u>Retail</u>		<u>Service</u>		<u>Other</u>	
	<u>1965</u>	<u>1966</u>	<u>1965</u>	<u>1966</u>	<u>1965</u>	<u>1966</u>
High Level	911	1,843	-	-	-	-

Summary

The economy of the reserves is indeed small in comparison to that of the district. Even if it utilized all its resources, one factor of importance would remain. The resources could not support all of the people. It is clear that at the present, and even more so in the future, more people must be absorbed by the surrounding economy if these people are to enjoy a standard of living comparable to that in other areas.

On the other hand, the quickly expanding economy of the area is short of people. People are being attracted from far distant areas to share in the development of the seemingly unlimited resources. It would appear that an obvious need can be met on both sides if the people are able to become involved.

THE COMMUNITY

Housing:

A majority of the Tallcree Band have not been living on their Reserves, presumably because until recently, they have been isolated. Instead, they have been building their own log houses in the area to the south and east of Fort Vermilion known as Chicago Town on privately owned land. Consequently, there has been little need for improved housing on any of the Reserves.

Beaver Ranch - There is one fairly large house in fair condition although not used continuously.

Tallcree No. 173 - There are about 30 people on this Reserve although only a small proportion of them live there consistently. Most of the young people live near Fort Vermilion where they have better opportunities for employment and education. There are six houses, all in poor condition, and with no facilities. Because of the location of the Reserve and the consistency of use made of the houses, it is difficult to determine the exact housing requirements. It appears, however, that those people who do live continuously on the Reserve have a need for better housing facilities.

Tallcree Prairie No. 173A - In the past year, there have been six new houses constructed on the Reserve. Previous to this, there had been no one living on the Tallcree Prairie. The construction of the graded road through the Reserve from Fort Vermilion has resulted

in new homes being built along it. It is not known how many families will move from their present location at Fort Vermilion to the Reserve.

Roads:

Until recently, there had been no graded or gravelled roads on any of the three Reserves. However, a graded gravelled road now connects the Beaver Ranch Reserve with highway No. 58 and approximately three miles of this road are through the Reserve.

There is now a road under construction that will pass through the Tallcree Prairie Reserve No. 173A and will consequently provide the Reserve with four and one half miles of grade on the Reserve.

At present, there are no graded or gravelled roads on the Tallcree Reserve No. 173 although there are numerous wagon and tractor roads cut on the Reserve, providing good access to most parts.

Services:

Because of the location and lack of development in the areas in which the three Reserves are located, there are no services supplied to the Reserves other than those which are supplied by government, primarily the Indian Affairs Branch. Indeed, as previously mentioned, it has only been recently that regular transportation has been possible to the Beaver Ranch Reserve and is not yet regular to the Tallcree Reserves 173 and 173A.

Those services such as education, etc., have only been acquired at Fort Vermilion.

Community Planning:

There has been no community planning done on any of the three Reserves except on the Tallcree Reserve No. 173A where the new houses are being constructed in an orderly pattern along one side of the road now under construction.

Land Tenure:

As none of the land has had any productive use, there has been no accepted form of tenure and it appears that all of the land is regarded as being Band land and not under the control of any individual. There may be variations from this, should the Band members begin to realize the productive value of some areas of their Reserve.

THE HUMAN RESOURCES OF THE RESERVES

The population of the Tallcree band as of March 31, 1967 was 179. At this time, there were an estimated 20 people on the Beaver Ranch Reserve and 30 on the Tallcree Prairie No. 173. The remaining 129 people all live in the area known as "Chicago town" at Fort Vermilion. The population distribution was not known at this time but was available as of December 31, 1965 and was as follows:

	<u>Male</u>	<u>Female</u>	<u>Total</u>
0 - 14	37	36	73
15 - 24	17	20	37
25 - 34	11	8	19
35 - 44	6	6	12
45 - 54	6	5	11
55 - 64	5	4	9
65 +	<u>7</u>	<u>5</u>	<u>12</u>
	89	84	173

According to some of the Band members, at one time, nearly all of the Band lived on the Tallcree Reserve No. 173 and on the Beaver Ranch Reserve and it has not been until the last ten years (approximately) that the movement of families from the Reserves to Fort Vermilion began. It would appear that the Tallcree Band was one of the first Bands in the area to realize the benefits of living near Fort Vermilion in comparison to living on the Reserves. The unfortunate aspect of this movement is that the

members have settled on privately owned land near Fort Vermilion and could be forced to move at any time.

POPULATION DISTRIBUTION

It should be noted that the population of this Band is more evenly distributed over its age groups than other Bands. This is supported by the fact that only 42.19 per cent of its population is below the age of 15 while this proportion in other Bands often exceeds fifty percent.

Education:

Most of the education received by the Tallcree Band has been at the Fort Vermilion Roman Catholic Separate School. The only records obtainable are total records for the school and do not separate the students of the Tallcree Band from those of other Bands. The records of the school are given, however, to give an indication of the distribution of the levels of education of the students.

SCHOOL ATTENDANCE

<u>Grade</u>	<u>1964-65</u>	<u>1965-66</u>	<u>1966-67</u>
1	18	18	10
2	12	13	19
3	8	11	21
4	11	9	13
5	7	7	9
6	5	10	6
8	1	3	5
9	2	1	2
10	-	-	-
11	-	-	-
Totals	<u>70</u>	<u>76</u>	<u>93</u>

There is a residence at the school which provides housing for the students. Additional education above that which the school offers is only received by the students leaving the area.

To show the education levels of the general population of the Band, the results of a survey are tabulated below:

<u>Grade Attained</u>	<u>Male</u>	<u>Female</u>
nil	2	-
1	-	-
2	-	-
3	1	-
4	1	-
5	-	3
6	1	-
7	-	-
8	-	2
9	-	-
10	-	-
11	-	-
12	<u>-</u>	<u>1</u>
	5	6

It should be noted that all of the men interviewed that had any schooling were in the 16 to 25 age group. Three of the females interviewed were in the same age group while one was in the 36 - 55 age group. It is interesting to note that at least one of the women interviewed had attained the grade XII level and two of them had grade VIII. Although this was a small sample of the people, it is felt that, in general, the education levels indicated by the survey would be representative of the population of the Band except for the sample of the females (It is very doubtful if 3 out of every 6 female members of the Band have an education of grade VIII or more).

Labor Force:

If the labor force was taken to be those people between the ages of 15 and 60, it would be made up of the following:

Total Male	52
Total Female	<u>40</u>
Total	92

The "effective" labor force would depend on the type of work that was offered. It should be noted that the majority of the older people can only speak the Cree language and that this fact alone would reduce the labor force by a high percentage if the employment required this ability.

Skills:

The skills that have been learned by the Tallcree people follow a pattern similar to that of their education. Listed

below is the number of people interviewed who had taken some special training.

	Male	Female
No Training	3	4
Adult Education	1	3
Cooking		2

These courses had been offered by the Indian Affairs Branch and have not been in existence for very long. It is expected that the participation in the courses would improve over time. The survey also revealed that nearly every one interviewed (especially the females) expressed a desire to have more courses given.

Work Experience:

	Males	Females
None	2	4
Worked in hospital	-	1
Farm worker	1	-
Construction worker	1	-
Seismic cutting	1	-
Surveying	1	1
Fire fighting	1	1
Waitress	-	1
Sawmill work	1	1

It should be noted that most of the work experiences gained by the people have probably been since they started migrating to Fort Vermilion and since the area began to develop. Since this has occurred, more opportunities have been made available to the people and although the survey does not reveal a large variety of experiences, the opportunities to participate in these will be better in the future. It is felt that emphasis on training and employment should be concentrated on the younger age groups of people.

Population Forecast:

To show the population growth expected, two facts should be considered:

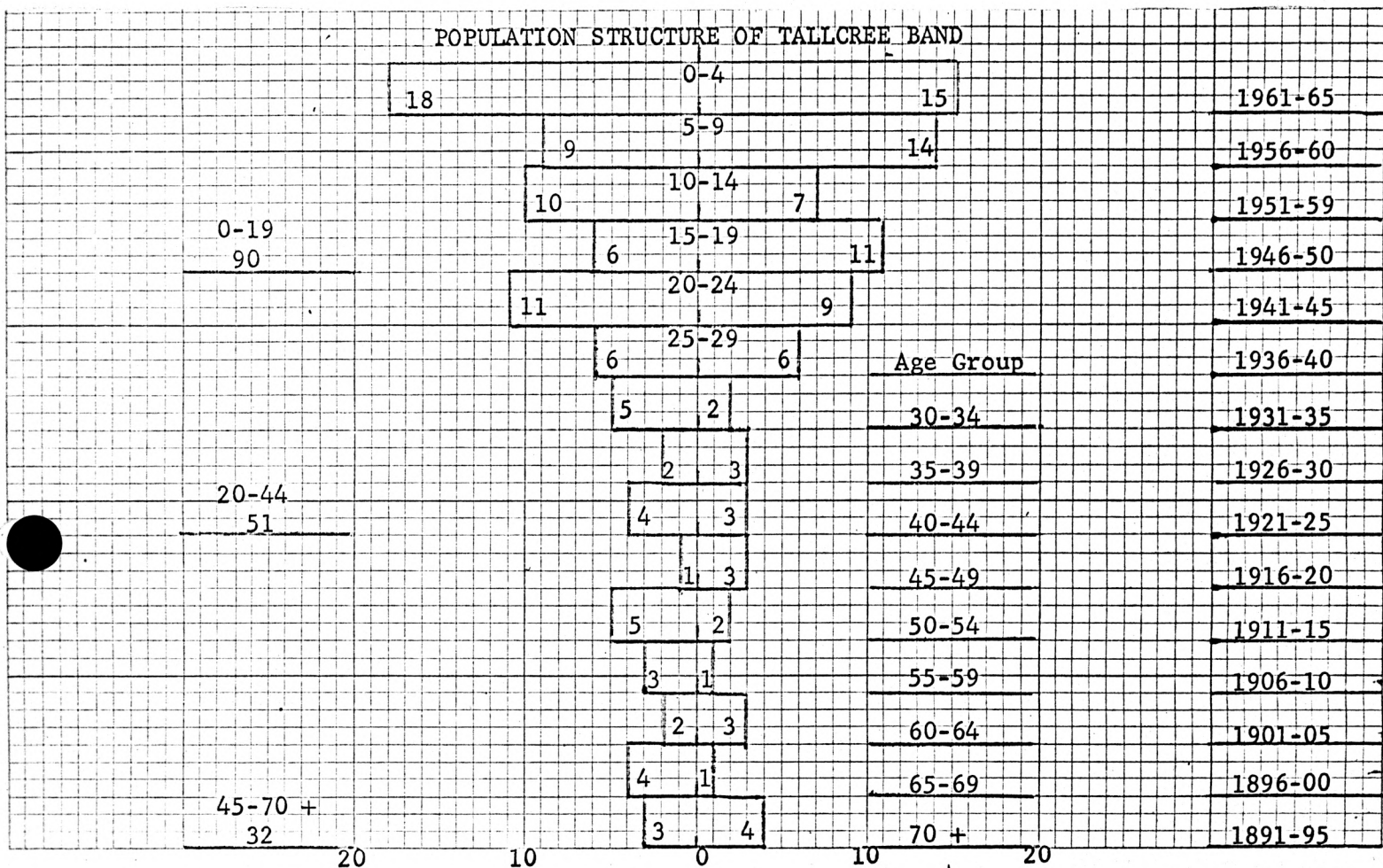
- 1) In the period between December 31, 1965 and March 31, 1967, the population has increased from 174 to 179 - an increase of 5 or 2.87%. (per year this = 2.29%)
- 2) That 73 or 42.19% of the population is below the age of 15 years.

(Both of these figures are much lower than those for the Little Red River Band).

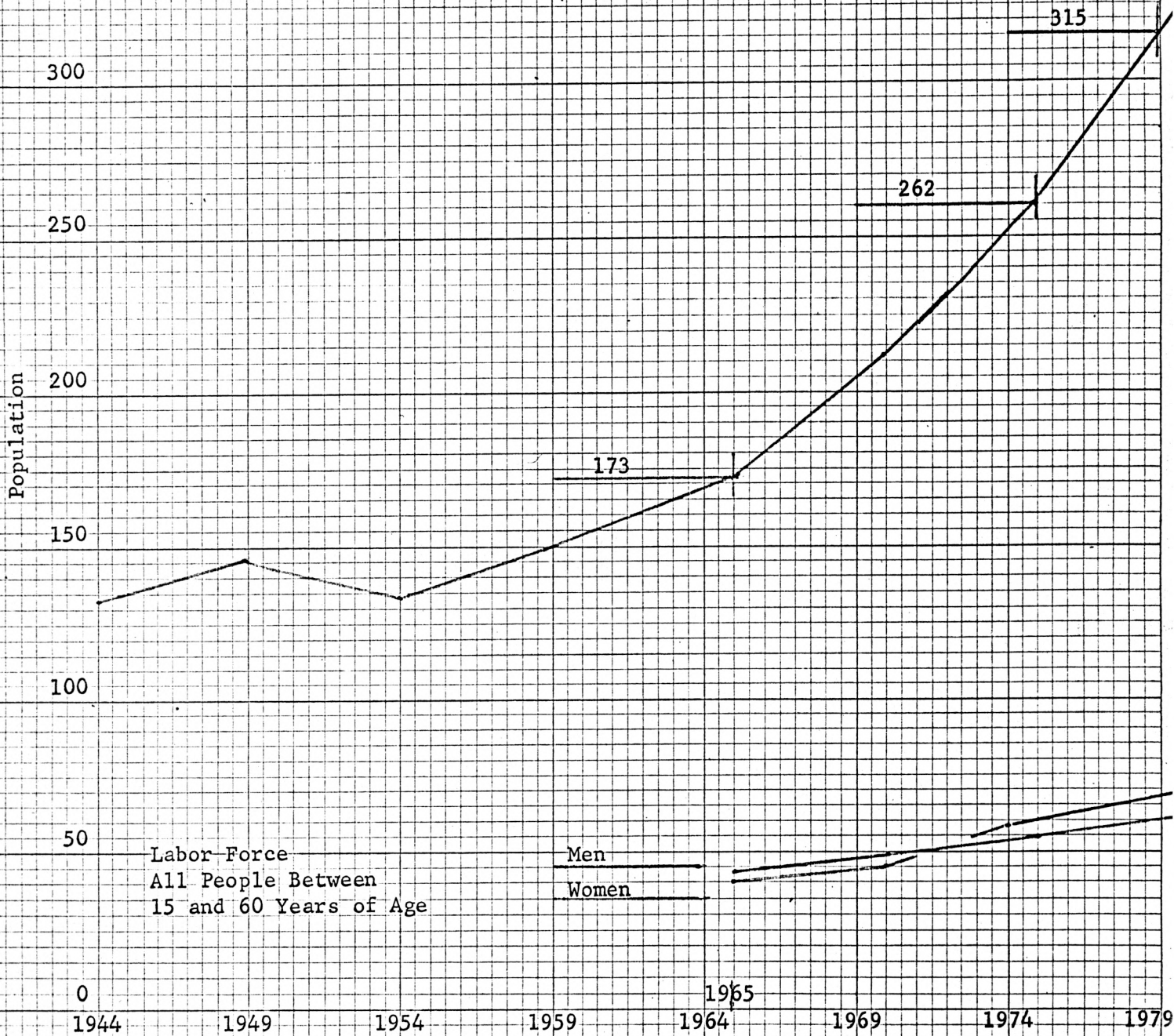
POPULATION AS OF DECEMBER 31/65

TALL CREE BAND

Age	Male					Female				
	On	Off	Crwn	Unst	Total	On	Off	Crwn	Unst	Total
0 - 4	6	12	0	0	18	4	11	0	0	15
5 - 9	4	5	0	0	9	6	8	0	0	14
10 - 14	6	4	0	0	10	2	5	0	0	7
15 - 19	3	3	0	0	6	3	8	0	0	11
20 - 24	4	7	0	0	11	5	4	0	0	9
25 - 29	0	6	0	0	6	1	5	0	0	6
30 - 34	0	5	0	0	5	0	2	0	0	2
35 - 39	0	2	0	0	2	0	3	0	0	3
40 - 44	1	3	0	0	4	2	1	0	0	3
45 - 49	1	0	0	0	1	2	1	0	0	3
50 - 54	1	4	0	0	5	0	2	0	0	2
55 - 59	2	1	0	0	3	0	1	0	0	1
60 - 64	0	2	0	0	2	0	3	0	0	3
65 - 69	0	3	0	0	3	0	1	0	0	1
70 +	1	2	0	0	3	2	2	0	0	4
Total	29	60	0	0	89	27	57	0	0	84



Population Growth and Projected Growth to 1979 for the Tallcree Band



THE PHYSICAL RESOURCES OF THE RESERVES

Agricultural Resources:

The value of the agricultural resources of all of the three Reserves has not been proven in practice as the areas in which they are located have not been opened for agricultural settlement. There is little doubt, however, that at least one of the Reserves has a very high potential if developed, this being the Beaver Ranch Reserve. The agricultural resources of the Tallcree Reserves undoubtedly also have potential, but this potential is contingent on other factors such as drainage in the case of Tallcree No. 173A and of accessibility and economics in the case of Tallcree No. 173. In summary, the following indicates the potential arable acreage for each Reserve:

Beaver Ranch No. 163	Present Reserve	1,582 acres ✓
	Possible Addition	7,158 " ✓
Tallcree No. 173		1,031 "
Tallcree No. 173A*		<u>4,600 "</u>
Total		14,371 acres

A more detailed description of the soils of each Reserve, their characteristics and limitations follows:

Beaver Ranch Reserve No. 163

The following discussion presents a description of its soils and an outline of development of the areas of the Reserve. Part of this section dwells on the possible addition to the Reserve that is being held in temporary reserve by the Alberta government.






Soils:

The soils of this Reserve are lacustrine and alluvial in origin and consequently are well sorted and generally of the

* See section - Soils - Tallcree Reserve No. 173A.
Soils on this Reserve appear to be quite acid.

BEAVER RANCH INDIAN RESERVE

Soils & Land-Use Map

Legend:  Good Agriculture Soil. Non-Agriculture Very Good Mosaic Poorly Drained Wasteland.

medium and fine textural classes. The layer of alluvium is thickest near the Peace River and thins northward towards the Caribou Mountains. The lacustrine layer of soil underlays the alluvium in most places and is revealed where the alluvial soil thins out. It is generally of a heavier texture (clay-clay loam) than the alluvial soil which is usually silt-loam to clay-loam in texture. There is also evidence of small gravel and sand deposits but these do not constitute a large area.

The textures found on the Reserve are excellent for cultivation - however, the quality of soils varies considerably with drainage. The different land use distinctions are based mostly on the drainage of the areas. There does not appear to be much evidence of salinity on the Reserve, however, most of the "Prairie" soils are alkaline in reaction. The well drained wooded soils are neutral to slightly acid in the surface horizons but more alkaline at greater depths.

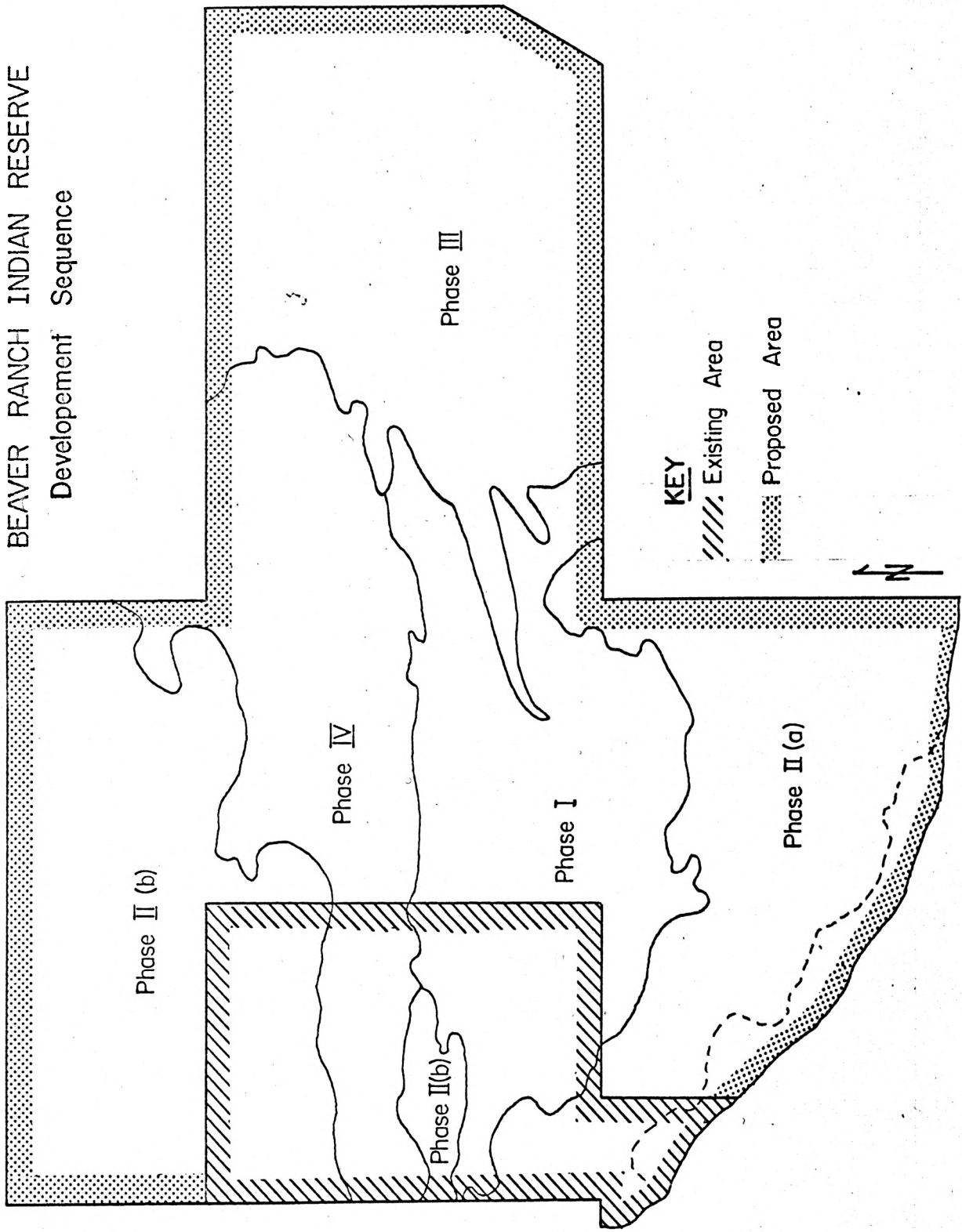
Development of the Reserve in Areas:

It is recommended that development of the Beaver Ranch Reserve occur in four phases, based on priorities developed for each area. These priorities include: The productivity of the soils, the costs of development, the accessibility and drainage of the area included in each phase.

Phase 1 The area included in phase 1 was given first priority for two reasons - (1) the productivity of its soils, and (2) the low cost of development. (See soils map and cost of development in appendix).

Phase II a) The area encompassed by Phase IIa includes mostly well

BEAVER RANCH INDIAN RESERVE
Development Sequence



and imperfectly drained soils as well as some poorly drained soils which occupy the depressions in the area. The brush cover is moderately heavy over most of the area and the topography is somewhat irregular. The soils are highly fertile although the drainage should be improved. The cost of this phase will be high due to the brush clearing, land levelling and drainage that is required. The productivity of its soils compensate for the higher cost of development.

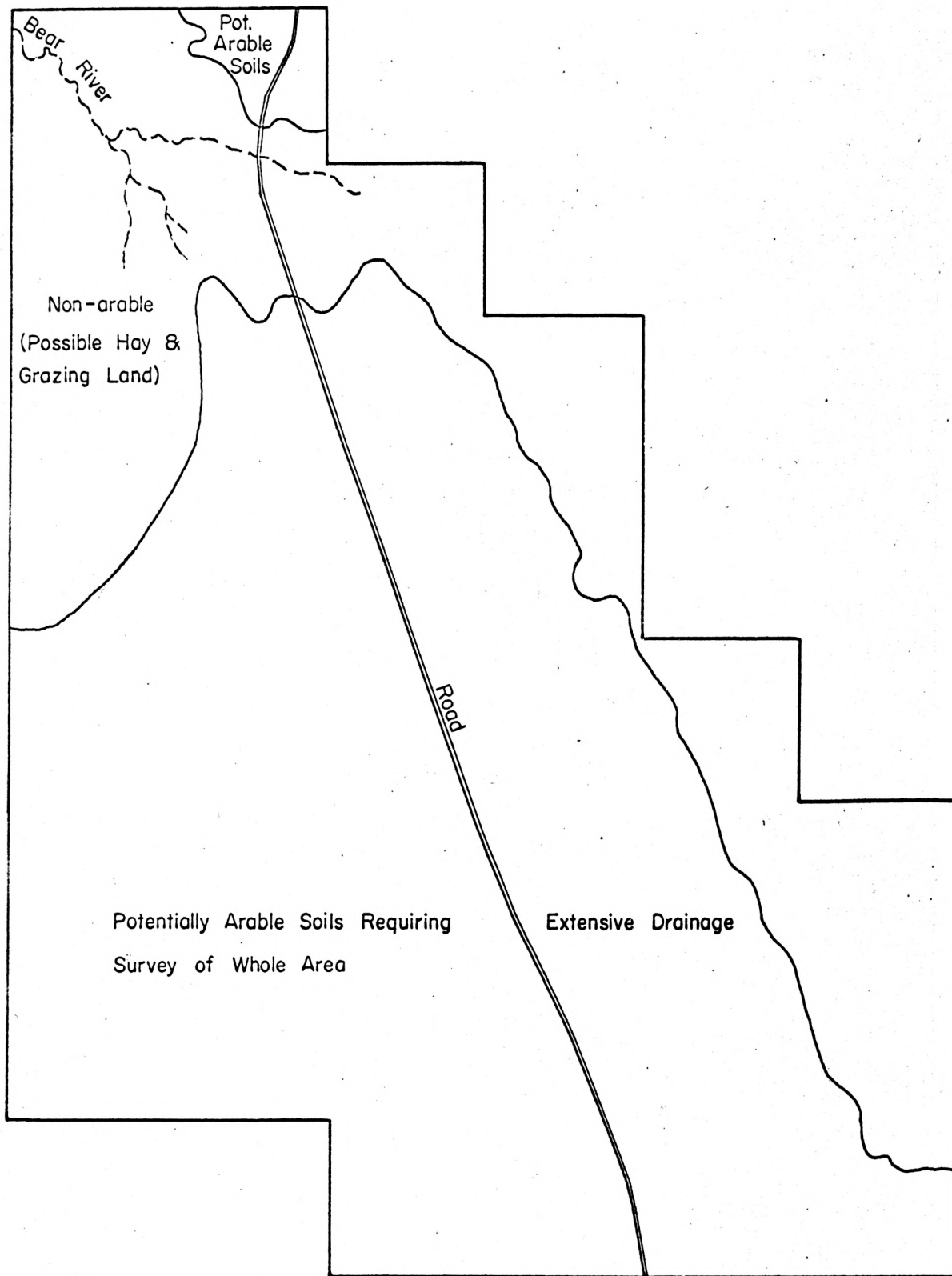
Phase II b) Phase II b is made up mostly of well drained wooded soils ranging in profile from dark grey to dark grey wooded. It is fairly uniform in brush cover and topography although it is cut by an eroded creek channel and by an area of poor drainage. The soils are of moderate fertility but should respond to chemical fertilizer. The cost and workability of this area gave it a second priority along with Phase IIa.

Phase III This enclosed area, found to the east of the Phase I area, suffers from poor drainage. Much of it is below its surroundings and consequently improving the drainage over much of the area will be difficult and costly. It appears also, that flooding from the Beaver Ranch Creek is frequent. The area contains some well drained soils but most of the area requires drainage improvement. In terms of priorities, this area has greater risks to development than the areas of Phases I and II.

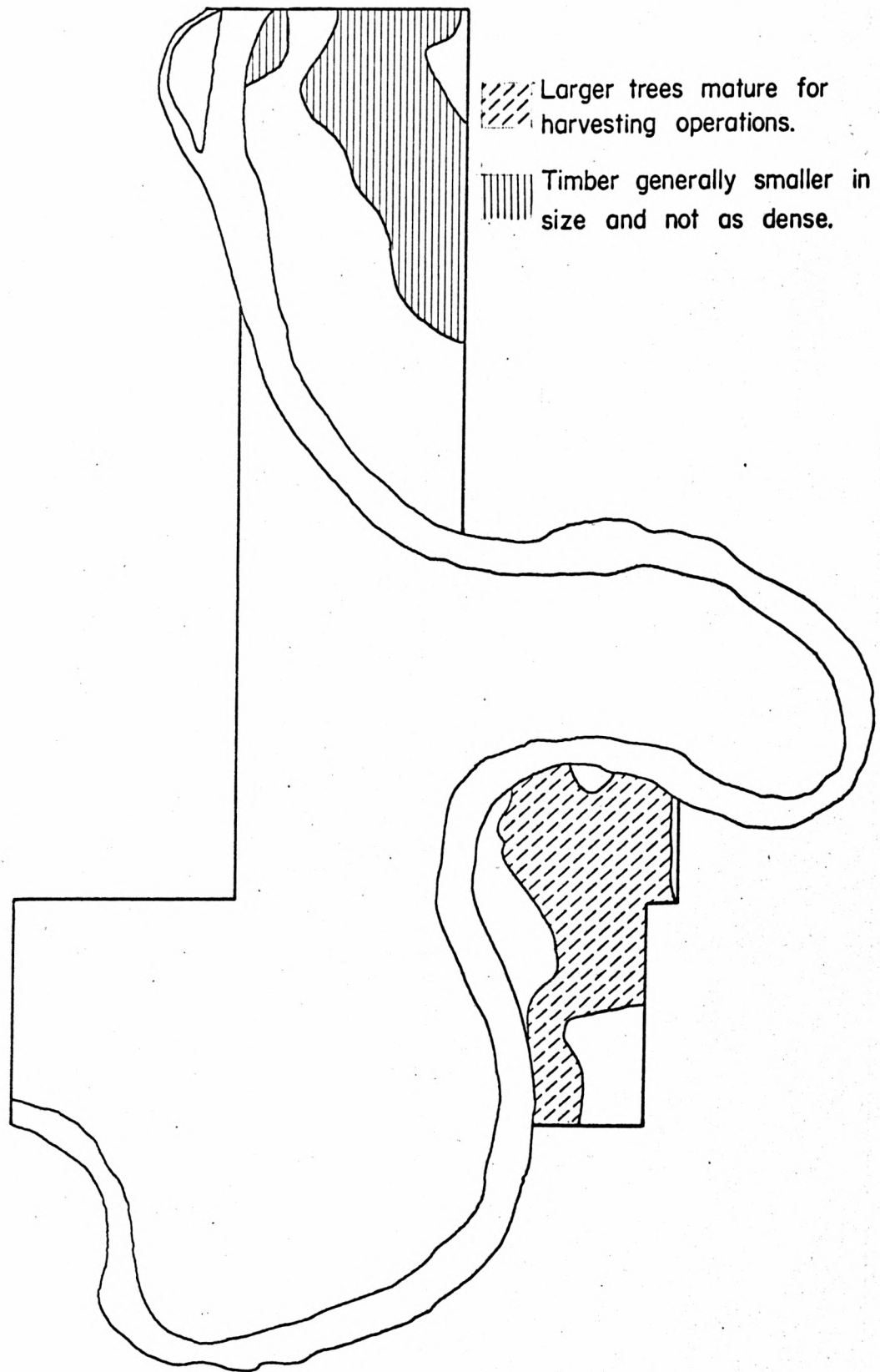
Phase IV Phase IV is made up of very poorly drained soils most of which are non-arable. There are imperfectly and well drained sites in this area but they are inaccessible because of the surrounding

TALLCREE PRAIRIE INDIAN RESERVE No. 173 A

Potentially Arable Soils



TALLCREE INDIAN RESERVE No. 173



poor drainage. It is doubtful if much of this area has potential unless extensive costs are incurred for improvements. It is not recommended that any development occur in this area at the present time.

Tallcree Reserve No. 173

Soils:

Nearly all of the soils of the Tallcree Indian Reserve No. 173 are found in the valley formed by the Wabasca River. They are generally alluvial in origin, deposited and formed by the meandering River. They range in surface texture from a fine sandy loam to a clay loam. On the natural open meadows are found generally well drained "black" soils of a depth of often 12" or more. Under forest cover, these soils are generally grey colored. There are few if any stones over most of the area.

The separation of arable and non-arable soils is done on the basis of drainage. The non-arable soils are those that are too poorly drained to permit development or are found in the water courses running down from the escarpment to the west of the Reserve.

Tallcree Reserve No. 173A

Soils:

The soils of the Tallcree Prairie are lacustrine in origin and are consequently flat and uniform. The surface texture is generally a clay or a clay loam and in the poorly drained "prairies"

Legal Desc.	Depth Inch.	Nitrogen Lb/Acre	Phosphorus Lb/Acre	Potassium Lb/Acre	Reaction PH	Condition MMH	Salts SO ₄	Organic Na Material	Free Lime	Texture
NE21-104-10-5	0-6"	4	10	224	3.7	2.2	H	*NL	L	NL 4

RecommendationsSpecial Comments

Lb. of Nutrient Required		
Nitrogen	Phosphate	Potash
50 Lb/A	45 Lb/A	15 Lb/A

Surphur is an important nutrient in your cropping program.

Your soil is low in organic material.
A crop rotation with forages is recommended.
This sample shows an acid condition which
will effect the growth of certain crops.
See Leaflet #6.

Legal Desc.	Depth Inch.	Nitrogen Lb/Acre	Phosphorus Lb/Acre	Potassium Lb/Acre	Reaction PH	Condition MMH	Salts SO ₄	Organic Na Material	Free Lime	Texture
SE29-104-10-5	0-6"	1	24	312	4.4	0.3	NL	NL H+	NL	4

Lb. of Nutrient Required		
Nitrogen	Phosphate	Potash
50 Lb.	30 Lb.	0 Lb.

Special Comments

As above.

Legal Desc.	Depth Inch.	Nitrogen Lb/Acre	Phosphorus Lb/Acre	Potassium Lb/Acre	Reaction PH	Condition MMH	Salts SO ₄	Organic Na Material	Free Lime	Texture
SE19-104-10-5	0-6"	0	7	498	4.4	0.4	NL	NL M	NL	4

Lb. of Nutrient Required		
Nitrogen	Phosphate	Potash
50 Lb.	30 Lb..	0 Lb.

Special Comments

As above.

* NL indicates Nil.

there is a layer of peat. Over much of the area, this peat layer has been burned off, revealing the mineral soils beneath.

Laboratory analysis has revealed that the "prairie" areas are very acidic at least in the surface horizons. This indicates that only the more acid tolerant crops and varieties should be grown. It also indicates that the availability of nutrients (especially nitrogen) is low and that fertilizer applications are a must.

Highly acid conditions can be corrected by "liming" the soil but this can be costly on larger acreages. It is strongly recommended that a cropping program be preceded by a detailed chemical analysis of the different field locations in order to select the more adaptive varieties.

In order of greatest adaptiveness to acid conditions, are the following cereal grains - oats, wheat, rapeseed, and barley, Creeping Red Fescue, Bluegrass, and Timothy are the more acid tolerant grasses. Few legumes, especially alfalfa, are tolerant to acid conditions unless the soil is limed.

Most of the Reserve suffers from poor drainage although in drier years, this may not be evident. There are areas, however, which support good aspen growth and are well drained but these areas are usually small and surrounded by areas of poor drainage. (The southern end of the Reserve contains more of the better drained soils). It would also appear that there has been a build up of surface water which may also have increased the level of the sub-surface water so that drainage of the whole area has been retarded. For this reason, it is recommended that a drainage survey be done on the Reserve and surrounding area to determine the extent to

which the area can be improved before any costs are incurred in land clearing and breaking.

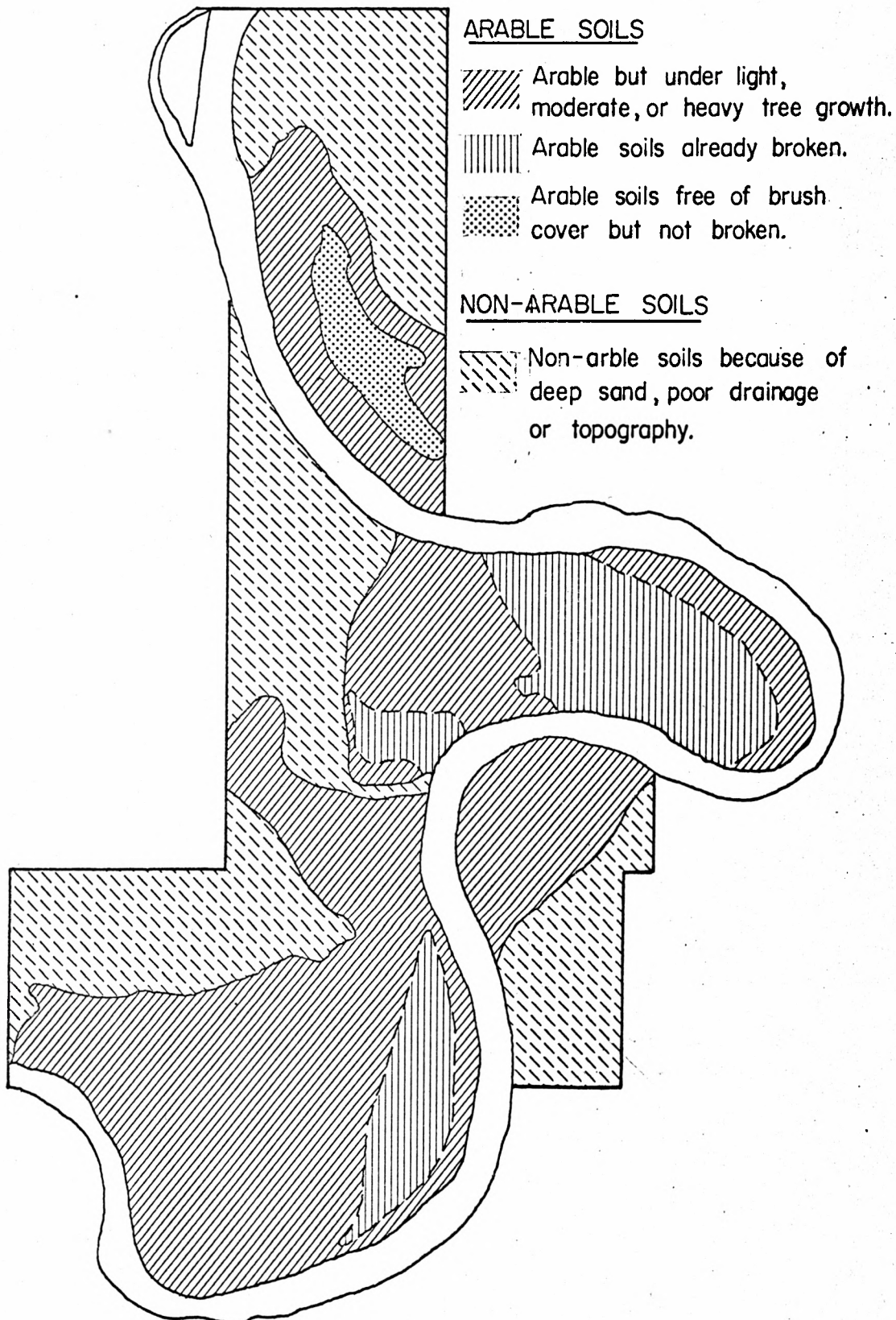
It is estimated that there are approximately 4,600 acres of potentially arable land should the drainage be improved. It is also possible that most of the remaining 930.95 acres could be used for hay land. (It should again be noted, that the use of the arable land, if developed, is restricted to acid tolerant crops at least over the "Prairie area").

NOTE: The native grass cover over most of the "prairie" area is such that it yields well and has a good grazing capacity (Less than 5 acres per cow in the summer months) but is low in protein and calcium content. It appears that the addition of legume hay could raise the content to the necessary levels. (Legumes are not recommended on very acid soils and should have to be grown elsewhere.)

Forest Resources:

The forest resources of all the three Reserves are limited in terms of supporting a large commercial enterprise. The Beaver Ranch and the Tallcree Reserve No. 173 do have some timber in a quantity large enough to develop a small enterprise. The forest resources of the Beaver Ranch Reserve extend along the Peace River. It is now being harvested on a custom basis with a non-Indian. There is little timber left on this Reserve but if the addition to the Reserve is completed, the potential will be increased although it will still be very limited. The resources of the Tallcree Reserve No. 173, on the other hand, are untouched and contain a significantly larger amount of timber. There is approximately ninety acres of large white spruce most of which is mature and some over matured and fallen. Rough estimates based on density and size of stands indicate that there is a potential worthy of further

TALLCREE INDIAN RESERVE No. 173



evaluation. (See appendix for map).

There is no timber potential (other than aspen) on the Tallcree Reserve No. 173A.

Minerals:

There are no proven discoveries of minerals on any of the three Reserves although the Band has been enjoying revenue from oil and gas leases. This revenue is likely to continue until the potential of the area has been completely proven.

Fish and Wildlife:

The resources of the Reserves themselves are limited merely because of their sizes. The areas surrounding the Reserves, however, do offer some potential.

The Beaver Ranch Reserve, situated on the Peace River, has the best fishing potential although there is no commercial fishing done in this section of the Peace River. The Tallcree Reserve No. 173 has the Wabasca running through it but the only fishing done is for sport or home consumption. The Tallcree Reserve No. 173A has no water resources for fishing.

All of the three Reserves are in areas which are relatively undeveloped and the areas still provide the natural habitat for game. The Tallcree Reserves are more favored in this way in that they are further from any populated areas.

Tourist Development:

The potential of the Reserves in this field depends on the potential on the whole area to attract the tourist dollar.

At present, tourism is not a large factor in the economy of the area. It is expected that in future, this will change.

The Tallcree Reserve No. 173A offers the best potential for tourism in that it is located in a valley along the Wabasca River and can offer sport fishing, etc. Its location near the Buffalo Hills and the already known fishing attraction at Wadlin Lake. It should be noted that if the road now being constructed from Fort Vermilion into the timber areas to the south of the Reserve, is extended on to the Lesser Slave Lake area, (there is considerable speculation that this will occur in the future - source - Northern Alberta Development Council) -the considerable increase in traffic could change the potential of the Reserve very favorably.

Industrial and Commercial Development:

There is little potential in this area for any of the Reserves. There is no base for industrial development and not enough people for any type of commercial enterprise.

Opportunities for OffReserve Employment:

The Beaver Ranch Reserve offers the best potential for off Reserve employment since it has all weather access to Fort Vermilion and High Level (This will soon be accomplished for the other Reserves as well). There is little economic activity in the areas immediately surrounding the Reserves and therefore, considering this aspect, the Tallcree people have more opportunity

near Fort Vermilion where many of them are presently living. As already mentioned, there are opportunities for trapping in the areas surrounding the Reserves. As the areas open up for agricultural settlement, this opportunity will decrease.

FACTORS GOVERNING DEVELOPMENT OF AGRICULTURE IN THE FT. VERMILION AREA

Climate Factors

The analysis of the weather conditions of the area was done exclusively from meteorological records obtained at Fort Vermilion. It should be noted that there is the possibility of variations from these records at other sites in the area since local conditions vary according to topography, air drainage and air movements even within relatively short distances. The air drainage at Fort Vermilion is probably better than over most of the area because of the Peace River channel and general slope toward the Peace River.

Geographic Location of Meteorological Site:

	<u>Latitude North</u>	<u>Longitude West</u>	<u>Height Above Sea Level</u>
Site 1	58° 23'	116° 03'	950 Feet
Site 2	58° 27'	116° 03'	-

Temperature

Temperature is an important factor in the growth of crops. It is reflected in the length of the "frost free" and "killing frost free" seasons which impose limitations on the kinds of crops that can be grown. It is also reflected in the "vegetative period" or the period during the season at which temperatures are high enough to promote growth; and in the availability of "heat units" which dictate the rate of growth of the plant and the length of the growing season it requires. Winter temperatures also play an important role in the maintenance and growth of animals and the consequent amounts of feed that are required.

Frost Free Season - Basis 32°F

The average frost free season is recorded at 65 days but the extremes have fluctuated from 5 to 104 days. This season, although limiting for succulent above ground garden crops has little effect on most root, cereal, and oilseed crops over most of their growth cycles as this temperature does not inflict extensive frost damage.

Killing Frost Free Season - Basis 28°F

The average for this season is 106.5 days but has fluctuated from 22.0 to 148.0 days. The average would appear to be sufficient for almost any crop but the variability of this season imposes obvious limitations even to cereal and oilseed crops, especially during their reproductive stages. The effect of the killing temperature of 28°F is discussed below:

Frost Free Season - Basis 32°F

	Average Frost Free Period	Last Frost (Spring)			First Frost (Fall)			Number Of Years Recorded
		Average	Earliest	Latest	Average	Earliest	Latest	
Site 1	65 Days	June 13	May 18	July 14	Aug. 17	July 17	Sept. 11	41
Site 2	63 Days	June 15	May 17	July 14	Aug. 17	July 19	Sept. 9	10
Longest on Record	104 Days		May 30		to		Sept 11	
Shortest on Record	5 Days			July 14	to	July 19		

Killing Frost Free Season (Basis 28° F)

	<u>Last Spring Frost</u>	<u>First Fall Frost</u>	<u>No. of Days</u>
56 yr. Average (1909-64)	May 30	Sept. 12	106.5
Shortest Season	June 28	July 20	22.0
Longest Season	April 17	Sept. 12	148.0

EFFECT OF "KILLING TEMPERATURES (28°F)"
ON COOL SEASON CROPS

Spring Growth:

Killing temperatures (28°F) in the spring will not kill cool season crops unless the growing points of the plants are above the surface of the soil. The growing point of the plant is that part of the seedling from which new plant tissue is produced. For the first few weeks after emergence, the growing point is below the surface of the soil and new tissue is pushed upward from the growing point. As the plant develops however, the growing point itself is pushed upward by the developing root system until it is above the ground surface. From this time on, a killing frost (28°F) will kill the growing point along with the rest of the plant and regrowth cannot occur. Until this time, a killing frost will kill the tissue above ground but since the growing point has been protected by the soil, it is not killed and will generate new tissue which will replace that tissue which has been frozen. A severe frost, for an extended period of time, may freeze the soil to a depth and this of course, will kill the growing point.

The time required for the growing point to extend above the ground is dependent on the species of plant and by the rate of growth that has occurred prior to freezing. This depends on other factors such as temperature and moisture. For most cool season crops, the time required is around 25 - 30 days after the seedling has emerged from the soil.

Fall Growth:

Killing frosts have a more pronounced effect on the reproductive parts of the plant (the seed). The damage that occurs depends on the degree of maturity that has occurred prior to the frost. Seed already in the ripening stage will be little affected but may suffer a decrease in quality and hence grade, when marketed. The softer the grain at the time of frost, the lower the grade that will be attained. Grain ripened and in the swath will not be affected.

The following Table I shows the time of seeding and the probabilities of "killing frost" in the fall for the different cool season crops.

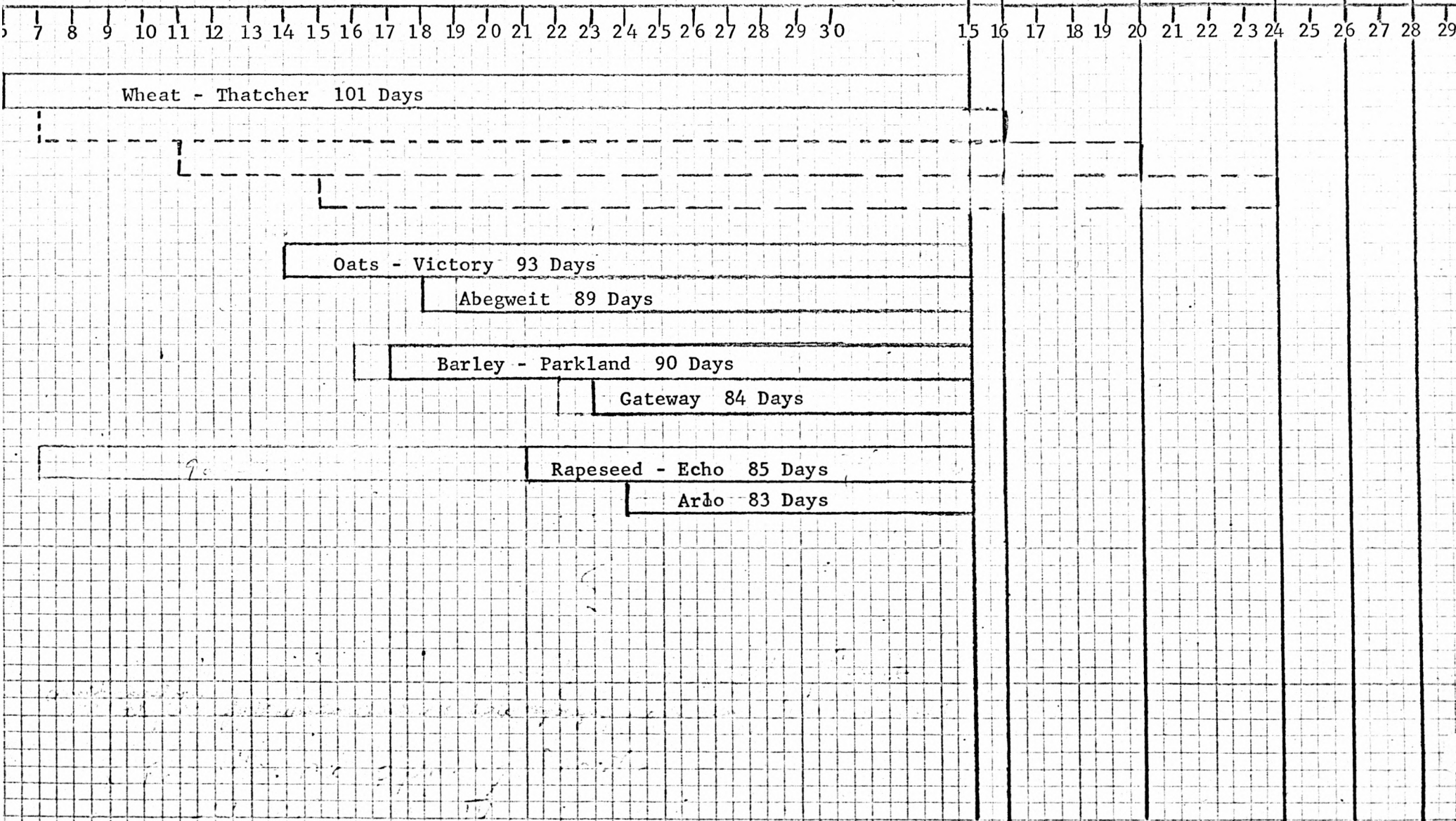
Table 1.

REQUISITE SEEDING DATES TO MINIMIZE FROSTS

Probability Of Killing Frost In August

Various Seeding Dates In May

0% 4% 8% 12% 16% 20%



Vegetative Period*

The vegetative period of a plant is the number of days with mean temperatures above 42°F required to bring the plant to maturity (42°F is the temperature at which growth appears to begin). For most cool season plants, the vegetative period required is 100 days. The season at Fort Vermilion supplies an average of 147 so it would appear that this factor is not limiting.

Availability of Heat Units

A plant requires a certain amount of heat to develop to maturity, the unit measure used in describing this requirement is the "degree day" (average daily temperature-42°F multiplied by the number of days in the growth season). For cool season crops the requirements is 1000 degree days but this varies somewhat with the species and the variety (Saunders Wheat requires an average of 1555 degree days). The growing conditions such as soil texture, color, compaction and moisture, etc. are also important in determining the requirement of the plant. Since the supply of heat at Fort Vermilion is an average of 1859 degree days it would appear that if the crop is seeded early enough and can take advantage of early spring heat, the supply should be adequate. It would appear that this factor is more important to the development of wheat than to the other crops as the margin of supply over the requirement is not great.

Considering all of the above temperature factors together, it is apparent that the killing frost free period is the most limiting factor in the development of the cool season crops. Second in importance is the supply of heat and the vegetative period. These lead to the conclusion that early seeding is a necessity if the above

* Based on Northwestern Canada's Climate, "its Effect on Crop Growth and Development", A.C. Carder - Beaverlodge

requirements are to be met. Wheat seeded later than indicated in Table I would have difficulty in maturing because of the lack of heat in the fall which would be required to mature the plant.

Precipitation:

The precipitation in the Fort Vermilion area is variable, both between years and between months. It is generally adequate, however, for the production of cereal, oilseed, and forage crops suitable to the area, although the variability of the precipitation is reflected in the yields. Evaporation is lower in the area than in most other areas of the same rainfall and this increases the effectiveness of the precipitation. The rainfall is somewhat unevenly distributed over the summer months, most of it falling in July and August. Spring moisture has to be conserved and careful seeding methods used in order to achieve even germination and early growth. The high incidence of rain in August makes harvesting more difficult and suggests the necessity of grain drying facilities.

The term precipitation averages suggests that the precipitation is increasing in the area, as shown by the following:

PRECIPITATION AVERAGES (INCHES)

<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>	<u>May</u>	<u>June</u>	<u>July</u>	<u>Aug.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Total</u>
56 year average (1909-64)												
.74	.60	.69	.58	1.28	1.77	2.10	1.78	1.23	.79	.70	.77	13.1
30 year average (1930-60)												
.84	.78	.84	.55	1.34	1.83	2.21	1.69	1.17	.76	.89	1.02	13.92
20 year average (1947-66)												
.81	.80	.71	.78	1.24	1.85	2.48	2.10	1.28	.95	.86	.98	14.90
10 year average (1955-64)												
.88	.74	.91	.73	1.21	1.89	2.82	2.21	1.34	1.07	.81	.93	15.50

Table II shows the monthly and yearly extremes that have been recorded since 1909. Because of the trend toward higher precipitation, extremes near to the extreme low have not been recorded in the last 20 years.

Table III showing the probabilities of different rainfalls unfortunately does not extend past the twenty year mark during which time there was not one recorded year with precipitation lower than 9".

Since most of the precipitation falls during the months of June, July and August, those years of high rainfall would imply very moist conditions during the growing and harvesting season - a condition which could hamper field work.

Table II

PRECIPITATION EXTREMES (1909 - 64)

	Monthly												Yearly
	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	
Low	0.00	0.02	0.05	0.00	0.04	0.12	0.20	0.26	0.02	0.07	0.06	0.05	6.67
High	2.10	2.14	2.13	3.58	4.18	5.56	5.53	3.98	3.08	2.86	1.81	1.95	20.4

Table III

PROBABILITIES OF VARIOUS YEARLY
PRECIPITATIONS (BASED ON YRS. 1947-66)

<u>9" - 11"</u>	<u>11" - 13"</u>	<u>13" - 15"</u>	<u>15" - 17"</u>	<u>17" - 19"</u>	<u>19" - 21"</u>
4 in 20 = 20%	1 in 20 = 5%	6 in 20 = 30%	4 in 20 = 20%	1 in 20 = 5%	4 in 20 = 20%

SEASONAL PRECIPITATION

	<u>56 Yr. Ave.</u>	<u>30 Yr. Ave.</u>	<u>20 Yr. Ave.</u>	<u>10 Yr. Ave.</u>
June	1.77	1.83	1.85	1.89
July	2.10	2.21	2.48	2.82
August	1.78	1.69	2.10	2.21
Total	5.65	5.73	6.43	6.92
September	1.23	1.17	1.28	1.34
October	.79	.76	.95	1.07
November	.70	.89	.86	.81
December	.77	1.02	.98	.93
January	.74	.84	.81	.88
February	.60	.78	.80	.74
March	.69	.84	.71	.91
April	.58	.55	.78	.73
May	1.28	1.34	1.24	1.21
Total	7.38	8.19	8.41	8.62

PRECIPITATION AND CROP YIELDS

A comparison has been made between the Fort Vermilion area and the Swift Current area of Saskatchewan - areas of nearly equal precipitation. This was done because in the Swift Current area, some basic relationships between rainfall and crop yields have been established. The comparison shows that the Fort Vermilion area is significantly more capable, as pointed out by its lower water deficiency, of producing higher yields of field crops.

	<u>Swift Current Area</u>	<u>Ft. Vermilion Area</u>
Precipitation	12 - 14"	13.1 (56 yr.av.)
Potential Evap-Transpiration	22"	18.8"
Actual Evap-Transpiration	12 - 14"	12.2"
Water Deficiency	8"	6.6"

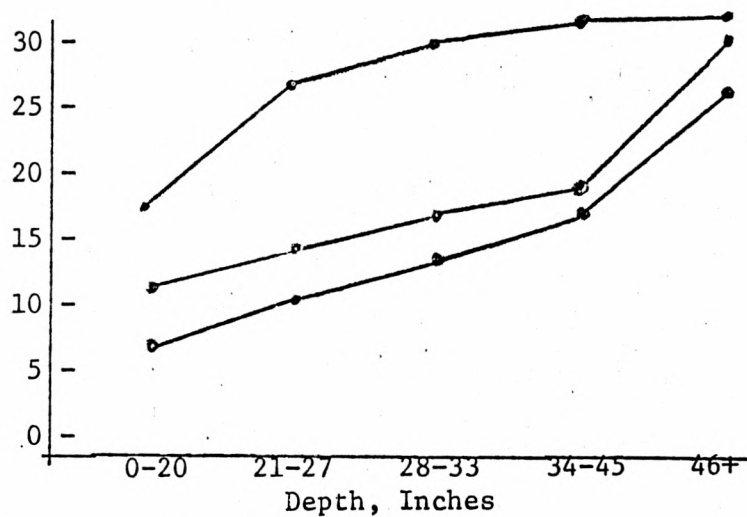
The long term average yield of wheat at Swift Current is 16 bushels/acre. Table IV shows the effect of different seasonal rainfalls and different moisture reserves on yields and how the yield will differ from the average according to these two moisture factors. Both the seasonal moisture and the moisture reserve are generally higher at Fort Vermilion and this will be reflected in the yields. This is further substantiated by the long term crop yields for Alberta and the Northern Peace River area.

Table IV

SEASONAL RAINFALL SOIL MOISTURE RESERVE

AND CROP YIELDS IN

SOUTHWESTERN SASKATCHEWAN*



** Table IV: Average yields of wheat in bushels per acre with various depths of moist soil at seeding time, and amounts of seasonal rainfall, southwestern Saskatchewan, 1939-1959.

** Taken from Publication 1090, November 1906

"Influence of Depth of Moist Soil at Seeding Time and of Seasonal Rainfall on Wheat Yields in Southwestern Saskatchewan"

- Research Branch Canada Department of Agriculture Ottawa.

Summary of Climatic Conditions

Summarizing the climatic factors of production it is concluded that grain crops can be produced in the Fort Vermilion area with reasonable consistency but that the following points should be noted.

1. Early spring seeding is necessary so that (a) the crop can avoid fall freezing and (b) the crop can utilize all available heat and vegetative days before cool temperatures arrive in the fall.
2. The farmer must be flexible in his planning should late spring weather or wet conditions hamper seeding so that an earlier maturing crop could be seeded.
3. The short seeding time suggests that large equipment and surplus horsepower is necessary so that field activities can be completed in a short time.
4. The high incidence of rainfall in the harvest months suggest the necessity of a grain dryer included in the yearly budget of time and expense.

It is further concluded that climatic conditions will produce crop yields comparable to those obtained in the Peace River area.

Soils

Most of the soils in the Peace River area are of the "grey wooded" classification which means that a great deal of leaching has occurred. They are generally low in organic matter and therefore significantly lower in nitrogen. Crops requiring relatively large amounts of nitrogen (such as rapeseed), will not yield as well as those which do not, but would respond extremely well to sufficient levels of fertilizer. It is assumed that in the past, the amounts of fertilizer used have been low and that this accounts, in part, for the relatively low yield of rapeseed.

Long Term Average Yields

<u>Years Included In The Average</u>	<u>Provincial Yield</u>			<u>Census Division 17*</u>		
	<u>Wheat</u>	<u>Oats</u>	<u>Barley</u>	<u>Wheat</u>	<u>Oats</u>	<u>Barley</u>
1921 - 30	18.3	32.0	25.1	21.1	32.5	24.4
1931 - 40	15.6	30.5	23.4	22.1	35.7	26.9
1941 - 50	16.8	32.0	24.0	22.6	39.9	24.8
1951 - 56	24.0	44.0	30.7	20.6	39.9	26.2
1921 - 56	18.1	33.6	25.2	21.7	36.7	26.2

* Fort Vermilion was previously in Census District 17 now incorporated into A.R.A. District 7. Statistics used are from Census District 17.

Analysis of the Potential for Grain Farming in the Fort Vermilion Area

Tables V, VI, VII, VIII, IX & X outline the gross revenue, operating expenses and net revenue that could be expected from an 800 acre individual farm and a 2,000 acre corporate farm.

Gross income is predicated on the use of long term average yields of crops in this area. The average yields do not indicate the results that could be attained by use of fertilizer in this area or the results that would occur with a properly financed, soundly consistuted farm operation.

Grain production in the Fort Vermilion area is more costly than in areas less isolated. Larger, more powerful equipment is necessary in order to plant and harvest the crop in the relatively short season available. Shipping costs are higher, both to the local elevator and from the elevator to grain terminals. All purchased inputs of the farm operation are more expensive and consequently require a higher level of management to overcome these disadvantages as compared to the more favored areas further south. In addition, it is anticipated that grain drying equipment will be required.

Management is critical to successful farm operations today. This is particularly true of the Fort Vermilion area where the natural factors of climate, soil as well as access to markets are less than optimum.

Farm operations - seeding and harvest - must be started and completed within a relatively short period of time as outlined in the summary of Table Ia on Climate.

Markets must be considered in selection of crops each year. Quotas prevail on delivery of many farm crops, but frequently vary according to crop. Hence it is possible to deliver malting barley in excess of the quota, or milling oats or rapeseed. These may be markets for feed grain. All of these alternatives must be considered together with an evaluation of their profitability.

A four year rotation of 2 parts barley, 1 part rapeseed and 1 part summerfallow will allow these requirements to be met.

It is essential that adequate fertility be maintained and commercial fertilizers used according to the fertility requirements.

Grey wooded soils are notorious for their deficiency of nitrogen and phosphorus and probably sulphur will be required. Adequate levels of phosphorus will hasten maturity and assist in reducing the hazards of frost.

With adequate fertility levels, it will likely be possible to eliminate the need for summerfallow. In its place, forage seeds or other crops could be used.

Careful selection of crops, timely field operations, particularly seeding and use of fertilizer are the three essentials to successful crop production in the Fort Vermilion area.

Equipment must be serviced and properly cared for. Failure to do this can result in costly repair bills and loss of time in critical periods of operation.

Good management can result in yields and profitability well in excess of the values predicted in this report. Poor management will have the reverse effect.

The best of equipment and opportunity will be useless without good management.

Productivity is the key to successful farming. Each additional bushel produced over the average yield is almost all profit. Increased yields will have a greater effect on the operator's net income than they will on the Band share paid as rental.

Farm size does not effect the revenue which the Band receives from land rental. It is extremely important to the operator. The amount of land which a man requires depends on his income requirement, productivity of the land and costs of production.

Table V

Capital Cost of Equipment For 800 Acre Grain Farm*

20' spring tooth cultivator	\$1,390.00
30' harrows	690.00
20' disk harrow with seed attachment	2,710.00
40' trail type sprayer	530.00
16' P.T.O. swather	1,540.00
40" Cylinder P.T.O. combine	7,020.00
15' deep tiller cultivator	1,280.00
607 plow diesel tractor	8,800.00
heavy duty trailer	550.00
32' auger	510.00
Grain dryer (batch type)	3,500.00
Total Machine Costs	<u>\$28,520.00</u>

Buildings

3 steel granaries @ \$600.00 each	1,800.00
30' x 50' machine shed	3,500.00
Tools	500.00
Total	<u>\$5,800.00</u>

Total Capital Investment Required - \$34,320.00

* Source - Alberta Department of Agriculture Bulletin 403-29-54

Operating Expense Advance Required

Fuel and Oil Cost	\$ 650.00
Repairs	455.00
Seed	1,050.00
Weed Spray (75¢ per acre)	300.00
Salary Advance	1,500.00
Total	<u>\$3,955.00</u>

In addition cost of fertilizer will range between \$3,000 to \$4,000.
A return on investment of from \$2.00 to \$3.00 can be expected for
each \$1.00 invested in fertilizer.

Table VI

Machinery and machinery operating costs as taken from the
Alberta Farm Economics Branch Publication F.M.D. - 403 to 55 - 1966
for 800 acre farm.(1)

<u>Machine</u> <u>600 Acres Crop</u>	<u>Cost/Hr</u>	<u>Acres/Hr</u>	<u>Hours</u> <u>Req'd</u>	<u>Total Cost/Year</u>	<u>Cost/Acre</u>
Spring Tooth Cultivator 20'	\$1.29	7.8	52	\$67.08	\$.11
Harrows 30'	1.18	17.4	48	56.64	.09
Discer Seeder 20'	3.46	7.8	78	269.88	.45
Sprayer 40'	2.00	22.0	20	40.00	.07
P.T.O. Swather 16'	2.35	7.8	78	183.30	.31
P.T.O. Combine 40" Cylinder	7.09	4.6	132	935.88	1.56
H.D. Cultivator 15'	.91	5.8	173	157.43	.27
6-7 Plow Diesel Tractor	2.58	-	581	1,498.98	2.50
H.D. Trailer	.72	-	100	72.00	.12
Auger 32'	1.28	--	100	128.00	.21
Total Equipment Cost Per Seeded Acre					5.69

200 Acres of Summerfallow

Spring Tooth Cultivator	1.29	7.8	104	134.16	.67
Tractor	2.58	-	104	268.32	1.34
Total Equipment Cost Per Acre of Summerfallow					2.01

$$\text{Annual machine cost per total acre } (\$5.69 \times 600 \text{ acres}) + (\$2.01 \times 200 \text{ acres}) =$$

$$\frac{\$3,816.00}{800 \text{ acres}} = \underline{\underline{\$4.77 \text{ per acre.}}}$$

In addition to these a grain dryer may be required. Assuming
10,000 bushels are dried, cost will be approximately 8.6 cents per
bushel or \$870.75 per annum.(2)

(1) The cost per hour includes all costs of machines such as depreciation,
interest, insurance, housing, repairs, lubrication and fuel and
oil costs.

Table VII

Gross Revenue, Operating Expenses and Net Revenue From
800 Acre Farm

600 acres crop	200 acres summerfallow
<u>Gross Revenue</u>	
Barley 400 acres @ 26 bu/acre	
Price \$.95/bushel	\$9,880.00
Rapeseed 200 acres @ 15.5 bu/acre	
Price \$2.15/bushel	6,665.00
Total	\$16,545.000
Gross Revenue/Seeded Acre - \$27.57	

Cost of Production

Machinery Cost - seeded acreage	\$3,414.00	
summerfallow	402.00	
Seed - Barley 600 bu. @ \$1.50/bu.	900.00	
Rapeseed 5 lb/acre @ 15¢/lb.	150.00	
Trucking to railhead (tenants share)	1,113.75	
Weed Spray (400 acres @ 75¢/acre)	300.00	
Wages for hired help	500.00	
Grain Drying (10,000 bu. @ 8.6¢/bu)	870.75	
Total Operating Expenses	\$7,650.50	
Cash rent \$1.50 per acre	1,200.00	
Total Expenses		\$ 8,850.50
Net Revenue for Management and Labour		\$ 7,695.00
Cost of production per acre excluding rental - \$9.56		
Operators net revenue per acre -	9.61	
Band share from rental per acre -	1.50	

Note: Cost of fertilizer will add an additional \$3,000 to \$4,000 to the expense account each year. However, a return of \$2.00 to \$3.00 for each \$1.00 invested in fertilizer may be expected.

Table VIII.

CAPITAL COST OF EQUIPMENT FOR
2000* ACRE CORPORATE FARM

1 - 20' spring tooth cult.	\$1,390.00
1 - 40' harrows	740.00
1 - 20' disk harrow with seed att.	2,710.00
1 - 40' trail type sprayer	530.00
1 - 16' S.P. Swather	3,290.00
2 - 40" cylinder P.T.O. combine	14,040.00
2 - 15' deep tiller	2,560.00
2 - 6 to 7 plow diesel tractor	17,600.00
1 - heavy duty trailer	550.00
1 - 32' auger	510.00
1 - Grain dryer (continuous flow)	6,100.00
	<hr/>
	\$50,020.00

Buildings:

6 steel granaries at \$600.00 each	3,600.00
30 x 50 machine shed	3,500.00
Tools	500.00
	<hr/>
	\$7,600.00

Total capital investment required \$57,620.00

* Source - Alberta Department of Agriculture Bulletin 403-29-54

Operating Expense Advance Required:

Fuel & Oil Cost	\$1,300.00
Repairs	700.00
Seed	2,625.00
Weed spray	750.00
Salary Advance	6,000.00
Other	500.00
	<hr/>
	\$11,875.00

Table IX

MACHINERY AND MACHINERY OPERATING COSTS
AS TAKEN FROM THE ALBERTA FARM ECONOMICS BRANCH
PUBLICATION F.M.D. - 403 TO 55 - 1966

1500 Acres Crop 500 Acres Summerfallow

<u>Machine</u>	<u>Cost Per Hour</u>	<u>Acres Per Hour</u>	<u>Hours Required</u>	<u>Total Cost Per Year</u>	<u>Cost Per Acre</u>
Spring Tooth Cult. 20'	\$1.04	10	300	\$312.00	\$.10
Harrows 40'	1.01	20	125	130.00	. 5
Diskier Seeder 20'	3.10	10	192	595.00	.39
Sprayer 40'	1.97	20	50	98.60	. 9
Swather S.P. 16'	5.70	7.8	192	1,094.00	.73
P.T.O. Combine }	7.09	4.6	324	2,297.00	1.53
P.T.O. Combine }					
Deep Tiller	.91	4.6	480	436.00	.15
6 to 7 Plow Diesel)	2.32		1,663	3,858.00	2.32
6 to 7 Plow Diesel)					
H.D. Trailer	.44		100	44.00	. 3
Auger 32'	1.28		60	76.00	. 5
				<u>\$8,940.50</u>	<u>\$5.44</u>

Table X

GROSS REVENUE, OPERATING EXPENSES AND
NET REVENUE FROM A 2000 ACRE CORPORATE FARM

1500 acres crop	500 acres summerfallow
Gross Revenue:	
Barley 1000 acres at 26 bus/ac.	
Price 95¢ per bus.	\$24,700.00
Rapeseed 500 acres at 15.5 bus/ac.	
Price \$2.15 per bus.	16,662.00
Total	41,362.00
Gross Revenue per seeded Acre	27.57
Cost of Production:	
Machine Cost 2000 Acres	8,940.50
Seed - Barley 1500 bu. at \$150 per bus.	2,250.00
Rapeseed 5 lb. per acre at 15¢ per lb.	375.00
Trucking to Railhead	2,000.00
Weed Spray 1500 acres at 75¢ per acre	1,125.00
Wages for hired help	500.00
Grain drying 20,000 bus. at 6.18¢	1,236.00
Total Operating Expenses	16,426.50
Cash Rent \$1.50 per acre	3,000.00
Total Expenses	19,426.50
Miscellaneous Expenses say	1,000.00
	<hr/>
	\$20,426.50
Revenue to labour and management	\$20,935.50

Notes of Crop Varieties and Cropping Practices

Table Ia in the Chapter on Climate, illustrates the importance of earlier seeding and defines the times at which various crops should be planted in order to reduce the damage from fall frosts. The damage done by these is considered to be much greater than the damage arising from spring frosts. In addition, the earlier grain matures and is harvested, the less risk there is of delays and losses in harvesting from inclement weather at this time.

Fall frosts may be anticipated anytime after the 15th of August and the danger increases sharply as the month progresses. (Table XII) - The chances of a frost on August 16 are 1 in 25. By August the 28th, these have increased to 1 in 5. In other words, in one year out of every five, there will be a killing frost by August 28th.

Maturity dates of cereals are fairly well established and are quite consistent. (Table XIII) - It is therefore a matter of planting the crops at a date which will allow them sufficient time to mature before fall frosts occur. In the case of Thatcher wheat which requires 101 days to mature, it will be necessary to plant it by May 6 if the frost hazard is to be reduced to a minimum.

Other varieties of wheat require a few days less to mature. Oats, barley and rapeseed require from 83 to 93 days to mature depending on variety.

Management must pay close attention to the growth time requirements of the crops when these selections are being made. Furthermore, crops selected must be seeded at the appropriate time.

Most crops must be planted between the 10th and 24th of May.

In addition to the advantage of avoiding or minimizing frost damage, earlier seeded crops will be able to make maximum use of the limited amount of moisture and rainfall available and greater opportunities will be provided for completion of harvesting operations before the arrival of inclement fall weather.

Barley and rapeseed together with forage seeds are the crops which appear to be best suited to the area.

These must be fitted into a carefully planned rotation. Because of disease build-up in the soil, it is not recommended that barley be grown on the same field more than one year in succession and rapeseed should only be grown on the same ground once every four years.

Table XII

OCCURRENCE PROBABILITIES OF
KILLING FROSTS (BASED ON YRS. 1941 - 1966)

<u>Date</u>	<u>Probability of Killing Frost</u> <u>On or After Date</u>	<u>Date</u>	<u>Probability of Killing Frost</u> <u>On or Before Date</u>
May 12	25 in 25 or 100%	Aug. 16	1 in 25 or 4%
13	24 in 25 or 96%	20	2 in 25 or 8%
15	22 in 25 or 88%	24	3 in 25 or 12%
18	19 in 25 or 76%	26	4 in 25 or 16%
19	18 in 25 or 72%	28	5 in 25 or 20%
21	17 in 25 or 68%	30	6 in 25 or 24%
22	16 in 25 or 64%	Sept. 2	7 in 25 or 28%
23	15 in 25 or 60%	3	8 in 25 or 32%
25	14 in 25 or 56%	4	9 in 25 or 36%
27	11 in 25 or 44%	5	11 in 25 or 44%
28	10 in 25 or 40%	6	13 in 25 or 52%
30	9 in 25 or 36%	7	14 in 25 or 56%
31	8 in 25 or 32%	8	15 in 25 or 60%
June 3	7 in 25 or 28%	9	17 in 25 or 68%
6	6 in 25 or 24%	10	19 in 25 or 76%
7	5 in 25 or 20%	11	20 in 25 or 80%
10	4 in 25 or 16%	12	21 in 25 or 84%
11	3 in 25 or 12%	13	23 in 25 or 92%
12	2 in 25 or 8%	14	25 in 25 or 100%
16	1 in 25 or 4%		

Table XIIIGROWING SEASON REQUISITESFOR COOL SEASON CROPS

<u>Crop</u>	<u>Variety</u>	<u>Approximate Days to Maturity*</u>
Flax	Noralta	120 days
	Raja	125 days
	Redwing	120 days
Wheat	Canthatch	101 days
	Thatcher	101 days
Oats	Abegweit	89 days
	Victory	93 days
Barley	Gateway	84 days
	Parkland	90 days
Rapeseed	Polish Varieties	90 - 100 days

* Determined from data collected at the Fort Vermilion Canada Department of Agriculture Experimental Station, (Progress Report on Variety Trials 1949-58 & 1958-63) from Alberta Farm Guide 1967, "Grain Varieties".

TIMING OF SEEDING OPERATIONS

Examination of the precipitation records for May, revealed that the variability of rainfall is quite high. Since timing and management of seeding operations is dependent on field conditions, the May precipitation can play a significant role. If field conditions are too wet at the time of seeding, then seeding operations are delayed and the fall frost risk factor increases. The Table V below indicates the percentages of years of various levels of rainfall based on the twenty year period (1947-66).

Table V

INCIDENCE OF LEVELS OFRAINFALL IN MAY

<u>Less Than 1"</u>	<u>1" - 1.99"</u>	<u>2" - 2.99"</u>	<u>3" +</u>
10 in 20	7 in 20	2 in 20	1 in 20

FORAGE CROP PRODUCTION

Because of the efficient use of available moisture in the Fort Vermilion area, forage crops can be grown more successfully than the annual precipitation, in comparison to other areas of equal precipitation, would indicate. However, the lack of available nutrients, characteristic of the grey wooded soil, limits the yields that are attained. Fertilizer trials at the Fort Vermilion experimental station indicate that hay and seed yields can be significantly increased by using sufficient amounts of nitrogen, phosphate, and sulphur fertilizers. However, because of the scarcity of cattle in the area, there is little market for hay crops.

The following shows some hay crop mixtures and some representative, unfertilized long term hay yields.

<u>Crop Mixture</u>	<u>Representative Hay Yield</u>
Alfalfa and Brome or Intermediate Wheat Grass	1 1/2 tons/acre
Mixed Grain (Oats and Barley)	1 1/2 tons/acre straw Approx. 1,600 pounds* grain

The lower Peace River area is well suited for growing forage seed, especially pedigreed alfalfa seed. This is because it is possible to isolate the fields completely from each other and from other alfalfa fields. The abundance of brush provides a habitat for

* 40 bushels/acre and 40 pounds/bushel.

the leaf cutter bee which is necessary for the pollination of the flowers and a consequent "seed set". The production of alfalfa seed, however, is still quite variable, since the leaf cutter bee requires warm sunny days which must fall at the time the flowers are forming. Careful planning of fields is also necessary so that any part of the field is within easy flying distance from the bees habitat. (a long, narrow field of about one hundred yards in width with brush along each side, is favourable. The brush around the small field areas will also hold a good snow cover which acts as an insulation and prevents winter killing.) Generally, stands will last for three years of crop so that every fourth year the stand should be worked and re-seeded.

Returns

The fluctuations in the market of forage seed are quite extreme. It is therefore difficult to predict the dollar return per acre. The following shows some of the returns that can be attained for a few forage crops.

	<u>Price</u>	<u>Yield</u>	<u>Gross Return</u>
Alfalfa			
(a) pedigreed	35¢ - 75¢/lb	50 - 200 lbs/acre	\$17.50 - \$150.00
(b) common	25¢ - 40¢/lb	75 - 200 lbs/acre	\$18.75 - \$80.00
Brome			
	8¢ - 20¢/lb	100 - 500 lbs/acre	\$8.00 - \$100.00
Creeping Red Fescue			
	10¢ - 25¢/lb	100 - 400 lbs/acre	\$10.00 - \$100.00

General Costs of Producing Forage Seed

Generally, a forage stand should be worked and reseeded every fourth year. This requires new seed since using home grown seed means using a second generation stock. It is also necessary to provide fertilizer with the seed and to broadcast nitrogen every year following. The crop can be straight combined or swathed, but care must be taken to avoid shattering. With either method, it may be necessary to dry the seed before storage.

The following is a general range of the costs which are involved:

Tillage and seeding - \$3.50 - \$4.00 every four years =	\$.90-1.00/yr.
Seed (\$3.50 - \$5.50 every four years) =	.90-1.40/yr.
Harvesting	5.00-7.00/yr.
Fertilizer	4.00-5.00/yr.
Interest on money involved in land development \$50/acre @ 6% =	3.00/yr.
Total Cost/Year	<u>\$13.80-\$17.40/yr.</u>

(Note: does not include seed dryings, storage, or trucking expense)

In view of the variability of production and the fluctuation in the market, it is not recommended that a specialized enterprise of this type be established at this time. Rather, forage seed production could be incorporated as part of a rotation with cereals. Close attention must be paid to production and marketing requirements.

Section B

Specialized Cow/Calf Enterprise

The purpose of this section is to compare the returns that can be earned by a one family enterprise using the same type and the same acreage of land as was used in the specialized grain enterprise - the objective to show the more profitable use of land.

The cow/calf enterprise is completely specialized so that a near optimum use of land, labour, and capital can be earned. For this reason it is designed so that the cow herd is kept in a feed lot all of the time and therefore no land is tied up in pasture. (It is recognized that more dry matter per acre can be produced if the forage stand is cut rather than pastured by the cow herd).

The method of putting up hay is the loose hay method using stack builders, loaders, and stack movers. The hay is fed mechanically in large hay bunks. This method was analysed since it is assumed to be one of the most efficient haying methods. A silage system could also have been used but the cost return analysis would not differ significantly since it is the dry matter yield silage that is measured; although it is likely that the silage method would be more labor intensive and would require a higher capital investment.

The rotation of forages has been established using mixed grain (oats and barley) and legume hay grown such a proportion that an approximation of the dietary requirements of the cow herd are met. The yields used are not averages but are estimates of representative yields based on unfertilized forage trials at the Fort Vermilion experimental station. (We have included the costs of spreading the manure on the land but have not attempted to show an increase in yield that the manure fertilizer would reflect.)

Analysis of a Specialized Cow-Calf Operation as Described:*

Data presented on this operation indicates that a herd of 280 cows and 8 bulls could be maintained by 800 acres of land together with their calves.

It will be noted that under the specialized system described, not only will this operation not be competitive with a grain production operation based on the same land, it is not feasible at all. The enterprise shows a net loss each year of \$8.37 per cow kept.

These data were of necessity based on average yields and herd performances as documented.

For example, if the weaning weight of the calves was 500 lb. rather than 420 lb., a net profit of \$6.38 could be obtained rather than the present loss of \$8.37. Reduction of calf crop losses would have a similar effect. Greater forage production per acre would allow increased herd size and lower feed costs. Market prices are of course, most important

Successful operation of a cow/calf operation is dependent on good or above average weaning weights, low calf losses and low feed costs.

It must be recognized though, that a cow/calf operation is a high cost, low return enterprise.

The following analysis of the investment in equipment livestock necessary for the operation described will provide some knowledge of the investment required:

<u>Item</u>	<u>Cost</u>
280 cows @ \$180.40 each	\$50,512.00
Machinery	22,200.00
Buildings	10,500.00
Total Capital Required	<u>\$83,212.00</u>

Assuming a full calf crop of 280 head, it would require \$17.83 per calf just to pay 6% interest on this investment.

* See Appendix Pages 1 - 14.

Gross Returns

Per Cow

Calf sold at 420 lbs. at \$23.21/100 lbs.	\$97.48	
Marketing Cost	\$2.40	
Transportation Cost \$1.30/cwt	5.46	
15% calf crop loss	14.62	
	<u>\$22.48</u>	22.48
		<u>\$75.00</u>
		\$75.00

Total Cost/Year/Cow

Cow Investment	\$22.20	
Cow Losses	3.61	
Building	5.25	
Breeding	5.77	
Bedding*	9.00	
Feed - Mill Feed*	2.45	
Alfalfa-Brome	16.62	
Mixed Grain	13.09	
Vet & Medicine*	2.20	
Manure & Snow Handling Costs	3.18	
	<u>83.37</u>	
Total Cost/Cow/Year		83.37
Labour Return/Cow		<u>-\$ 8.37</u>
Labour Return on 280 Cows		
280 x -8.37 =		-\$2,343.60 Loss

* Costs taken from "1965 Alberta Cow-Calf Enterprise Analysis".

Minimum Cattle Liner charge established by Alberta Motor Transport Association.

Further, the capital requirement shown does not include the cost of clearing and breaking the land nor does it include an interest charge on this investment.

Two alternatives to livestock production via the cow/calf enterprise type appear available. Both of these are complimentary to grain production enterprises. The first alternative includes a portion of the arable land on the farm used to support a small herd. The second proposes the use of waste land not suitable for cultivation either on or off the farm as grazing land supplemented by native hay for winter feed.

For the first alternative, land which normally would be summerfallowed would be put into grazing or hay land. On the basis of an 800 acre farm on a four year rotation, 200 acres could be seeded down every four years and used for 4 years to support the herd. On the basis of 5 acres per cow and calf for total support, 200 acres would support a herd of 40 cows. On the basis of the information provided in appendix 29 taken from the 1966 Alberta Cow-Calf enterprise analysis of the Alberta Department of Agriculture, the return to labor and management from a herd of 40 cows would be \$511.60.

It must be remembered that 1966 was a year of high returns to the beef industry and possibly not indicative of average returns over a period of years. In addition, there is a higher freight charge from Fort Vermilion to Edmonton.

These are however average figures and good management could increase the net revenue substantially.

Capital requirement for a herd of 40 cows and 2 bulls would be approximately \$8,200.00.

The second alternative is use of waste land and native hay adjacent to the farm. These would lower costs slightly. However, investment costs remain the same and cost of harvesting and transporting hay to the cattle is substantial and should not be ignored.

The herd could conceivably be of any size. Forty to 50 cows appears to be the minimum size of herd. Returns generally will again depend on management. The Alberta Guide mentioned again provides guidelines for this enterprise.

APPENDIX 1

ACREAGES OF TALLCREE RESERVE #173

Arable Acreage	Cleared & Broken	Clear of Bush Unbroken	Bush Acreage	Clearing Cost	Pile Clean-up	Breaking Cost	Total Cost/A	Total Cost
	210			--	--	--	--	
		43	688 under timber 90*	18	3	10	31	\$21,328
		<u>43</u>		20	5	10	10	430
1,031	<u>210</u>						35	<u>3,150</u>
Non-Arable Acreage								\$24,908
563.92								

* It is assumed that the timber would be harvested first. If not, the costs would be much higher.

APPENDIX 2

COST OF DEVELOPMENT OF THE BEAVER RANCH RESERVE NO. 163

Phase	Arable & Potentially Arable Acreage		Acres Bush	Clearing and Piling Cost/A	Root Picking Levelling Cost/A	Discing 2x Cost/A or Plough	Total Cost/A	Total Cost
	In Present Reserve	In Possible Addition						
I	600	1,600	\$600 \$1,600			\$10/A \$10/A	\$10/A \$10/A	\$ 6,000 \$16,000
II(a)	344	2,015	344 2,015	\$20 \$20	\$5 \$5	\$10 \$10	\$35 \$35	12,040 70,525
II(b)	638	1,684	638 1,684	\$18 \$18	\$3 \$3	\$10 \$10	\$31 \$31	19,778 52,204
III	<u>1,582</u>	<u>1,859</u> <u>7,158</u>	1,859	\$18	\$3	\$10	\$31	<u>57,629</u> <u>\$234,176</u>

APPENDIX 3

LIST OF LOCAL SAWMILLS IN DISTRICT

<u>Name</u>	<u>Address</u>
Banman, Herman T.	Box 177, La Crete
Benson Sawmill Limited	Box 506, High Level
Brewster Construction Ltd.	Box 417, High Level
Driedger, Jacob W.	Box 63, La Crete
Island Sawmill Ltd.	Fort Vermilion
McKenzie Logging Ltd.	Box 176, High Level
North Peace Logging Ltd.	Box 420, High Level
R.N.B. Logging Ltd.	High Level
Rogers Sawmill	Meander River
Salvadore, Leno	High Level
Scarfe, R.H.	Box 56, Fort Vermilion
Schlamp, John C.	Box 196, La Crete
Schmidt, Wm.	Box 54, Fort Vermilion
Siemens, J.P.	Box 156, Fort Vermilion
Villeneuve, Lawrence	Box 93, Fort Vermilion
Wiebe, Andrew	La Crete
Wiebe, John B.	Box 74, La Crete

Source: Statistical Analysis of Census Division 15 - Alberta
Bureau of Statistics

APPENDIX 4

Oil Production in Thousands (Barrels)

	<u>1965</u>	<u>1966</u>	<u>Cumulative</u>
Rainbow	6	2565	2571

Gas Reserves December 31/66

		(1)	(2)	(3)	(4)
Rainbow	Keg River*	3	2	1240	2
	Keg River Assoc.	83	60	1260	76

* Considered beyond economic reach

- (1) Estimated Original Gas in Place (B.C.F.)
- (2) Remaining Marketable Gas Dec. 31/66 (B.C.F.)
- (3) Heating Value (B.T.U.) Cu. Ft.
- (4) Remaining Marketable Gas (100 B.T.U. Basis) (B.C.F.)

Natural Gas Production in Census Div. 15

1958-1966 and Cumulation 1914 - 1966

Volume in M Mcf at 14.14 psia & 60°F

	<u>1965</u>	<u>1966</u>	<u>Cum. to Dec. 31/66</u>
Rainbow	3	1673	1676

APPENDIX 5

	<u>Crude Oil</u>	<u>Raw Gas</u>	<u>Well Count</u>	
			<u>Operated</u>	<u>Capable</u>
Rainbow	8,955,322	6,080,951	46	63
Rainbow South	1,042,935	1,076,233	6	9
Zama	1,235,286	384,813	59	82

Oil & Gas Cons. Board - August 1967 Publication

APPENDIX 6

Condition of Farm Land - 1961

- Acreage -
Improved Land

	<u>Total</u>	<u>Undercrops</u>	<u>Summerfallow</u>	<u>Pasture</u>	<u>Other</u>
I.D. 147	42,234	33,669	6,577	2,341	647

Unimproved Land

<u>Total</u>	<u>Woodlands</u>	<u>Other</u>
62,577	18,479	44,098

No. of Farms By Acreage, Census District 15, 1961 (acres)

	<u>All Farms</u>	<u>Under 3</u>	<u>3-9</u>	<u>10-69</u>	<u>70-239</u>	<u>240-399</u>	<u>400-559</u>	<u>560-759</u>
I.D. 147	280	1	1	2	73	123	31	27
	<u>760-1119</u>	<u>1120-1599</u>	<u>1600-2239</u>	<u>2240-2879</u>	<u>2880 +</u>			
	13	8	-	1	-			

Livestock Population on Farms in Census District 15 - 1961

	<u>Horses</u>	<u>Cattle</u>	<u>Sheep</u>	<u>Pigs</u>	<u>Chickens</u>
I.D. 147	455	3329	312	6031	25,673

APPENDIX .

Area in Acres of Certain Field Crops in Census District 15 - 1961

	<u>Wheat</u>	<u>Oats</u>	<u>Barley</u>	<u>Rye</u>	<u>Flax Seed</u>	<u>Mixed Grain</u>	<u>Tame Hay</u>	<u>Rapeseed</u>	<u>Corn Ensilage</u>	<u>Oats for Hay</u>	<u>Potatoes</u>
I.D. 147	4756	9348	2986	60	6312	103	3435	6000	-	628	40

TRANSPORTATION

Motor Vehicle Registration by Residence Census District 15 1967

	<u>Passenger Car</u>	<u>Truck</u>	<u>Other</u>	<u>Total</u>
High Level	223	316	37	576
Fort Vermilion	197	191	44	432

PUBLIC UTILITIES IN SELECTED DISTRICTS

Electric Meter Registrations by Company Census District 15 - Dec. 31/64

	<u>Rural</u>	
	<u>Domestic</u>	<u>Commercial</u>
Fort Vermilion	88	52

Total Land Area, Sewer and Water Main Mileage in Selected Centres
in Census District 15

	<u>Total Land Area</u>	<u>Sewer & Water Mains</u>	
		<u>Sanitary Sewers</u>	<u>Water Mains</u>
High Level	2,720 acres	1.3 miles	1.3 miles

Road and Street Mileage in Selected Centres in Census District 15 - 1965

	<u>Main Prov. Highways</u>	<u>Local Roads & Streets</u>	<u>Public Lanes & Alleys</u>	<u>Total</u>	<u>Paved Surfaces</u>	<u>Gravel</u>	<u>Earth Road Graded & Drained</u>
High Level	5.0	3.8	1.0	9.8	-	8.0	2.0

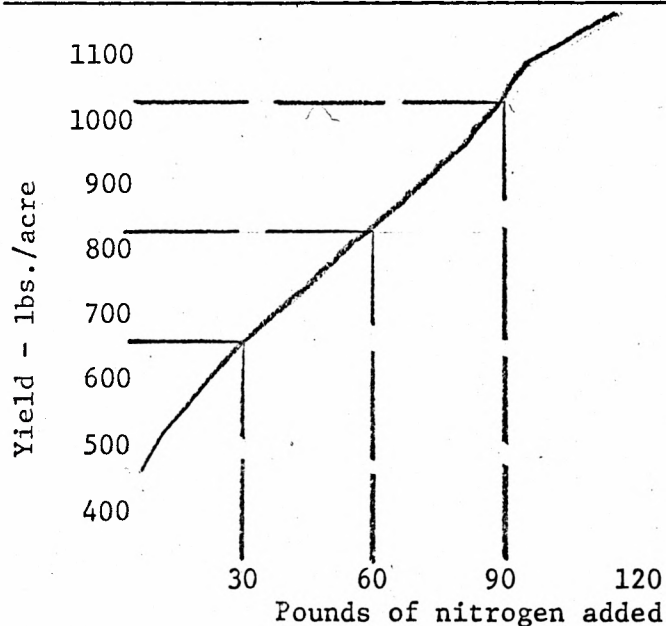
APPENDIX 9

Fertility Requirements of Rape

a) Nitrogen

Work over the last six years has shown that rape responds exceedingly well to nitrogen when this element is in low supply in the soil. In the last three years, eight trials with rape have been placed on soils where the available nitrogen was low. The average response to nitrogen recorded in the trials is given in the figure below. Five out of the eight trials responded economically up to 120 lbs. of nitrogen per acre; whereas, all responded profitably up to 90 lbs. of nitrogen per acre. This year the maximum rate of nitrogen was 240 lbs. per acre. One trial, where moisture was adequate and weeds were not a problem, responded linearly up to 240 lbs. per acre of nitrogen. The treatment where 5 lbs. of nitrogen was added yielded 397 lbs. of rapeseed; while the 240 lb. treatment yielded 2,180 lbs. A remarkable increase!

EFFECT OF ADDING NITROGEN ON THE YIELD OF RAPESEED



APPENDIX 10b) Phosphorus

When available phosphorus is low in the soil, rape responds well to added phosphorus; doubling and tripling of yields have been obtained. However, when the level of available phosphorus is medium or high, rape does not appear to respond at all to added phosphorus. The following table, which compiles six years of data, illustrates this point.

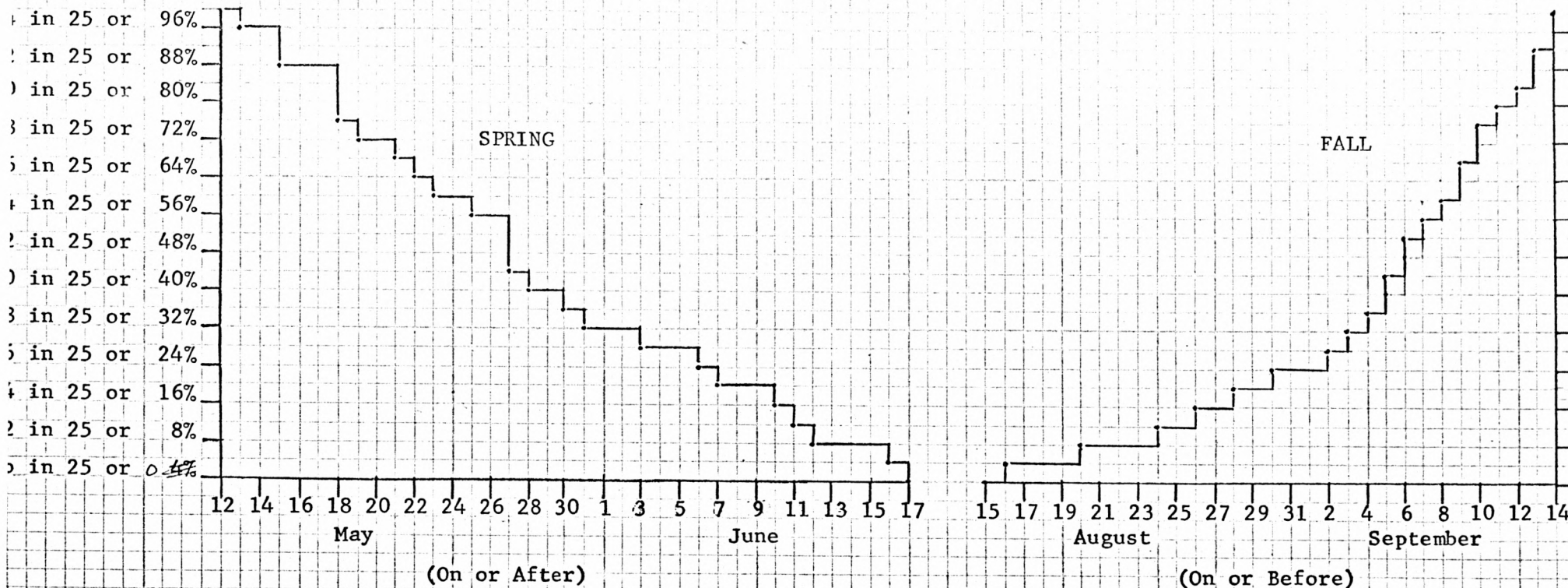
Available phosphorus lbs./acre	No. of Experiments	No. of Experiments responding to phosphorus
0 - 8	8	8
>18	10	1

APPENDIX 11

PROBABILITIES OF KILLING FROSTS

OCCURRING - BASIS 28° F (BASED ON THE 25 YRS. 1966-42)

Probability



APPENDIX 12

General Field Operations Required for Cereal Production, 800 Acre Farm

	Acres	Hours Req'd
<u>Barley on Summerfallow</u>		
Disc and seed	200	26
Harrow	200	12
Spray	200	10
Swath	200	26
Combine	200	44
Fall Cultivation (deep tiller)	200 (twice)	69
<u>Rapeseed on Barley Stubble</u>		
*Cultivate (spring)	200	26
Harrow	200	12
Disc and seed	200	26
Harrow	200	12
Swath	200	26
Combine	200	44
Fall Cultivation (deep tiller)	200 (twice)	69
<u>Barley on Rapeseed Stubble</u>		
*Cultivate	200	26
Harrow	200	12
Disc and seed	200	26
Harrow	200	12
Spray	200	10
Swath	200	26
Combine	200	44
Fall Cultivation	200 (once)	35
<u>Summerfallow</u>		
4 Cultivations	200 (4 times)	104
Tractor time required		697

* Note:

The spring cultivations may not be necessary on stubble every spring and direct seeding with the diskier could be done if weed conditions allowed.

Feed Value of Hay*

	<u>K. Cal. D.E.</u>	<u>% Protein</u>	<u>% Ca.</u>	<u>%P.</u>
Alfalfa-Brome	950	14	1.4	.23
Straws	850	4	.24	.09
Mixed Oats & Barley	1,450	11	.075	.375

* K.Cal.D.E. - kilcalories of digestible energy

Ca. - Calcium P - Phosphorous

- Alberta Farm Guide - 1967

Since the grain will not be separated from the straw, the straw will be fed with the grain in a ratio of 3,000 to 1,000 of 1.875 of straw to 1 of grain. The alfalfa will be a supplement to the mixed grain hay to add additional energy and to raise the protein and calcium level of the ration.

Suggested Ration

Cows - 11.5 pound mixed grain hay (4 lbs. grain & 7.5 lbs. straw)
+ 10.25 pounds alfalfa-brome.

	<u>K.Cal.D.E.</u>	<u>% Protein</u>	<u>% Ca.</u>	<u>% P.</u>
4 lbs. grain	5,800.0	11	.075	.375
7.5 lbs. straw	6,375.0	4	.24	.09
10.25 lbs. alfalfa-brome	9,737.5	14	1.4	.23
<u>21.75 lbs.</u>	<u>21,912.5</u>	<u>10</u>	<u>.756</u>	<u>.209</u>

Bulls - 12.75 pounds mixed grain hay + 12 pounds alfalfa-brome hay.

Annual Feed Requirement of Cow

Cold weather and nursing a calf put heavy requirements on the beef cow. For this reason the yearly feed requirements have been calculated on the basis of the winter ration used the entire year even though the cow will not require the same amount of energy for warmth or for ranging since she will be enclosed within a small area.

YEARLY REQUIREMENTS OF COWS

	<u>Per Day</u>	<u>Per Year</u>
Mixed Grain Hay	11.5 pounds	4,197.5 pounds
Alfalfa-Brome Hay	10.25 pounds	3,741.25 pounds

CARRYING CAPACITY OF FARM

(1) On basis of Alfalfa-Brome produced:

$$1,188,000 \div 3,741.25 = 317 \text{ head}$$

(2) On basis of Mixed Grain Hay produced:

$$(792,000 + 422,400) \div 4,197.5 = 289 \text{ head}$$

Therefore farm will be budgeted for:

280 cows plus 8 bulls.

Cow Investment Costs

Replacement cost cow 3 yrs. ol.	= \$170.00	
Additional freight from Edmonton	= 10.40	(\$1.30/100 lb.)
Total replacement value of 3 yr. old	= \$180.40	\$180.40
Depreciated value after 5 calves	140.00	
Less Freight Costs	13.00	
Total Value	\$127.00	\$127.00
		\$ 53.40

Depreciation

or \$53.40/5 years	= \$10.68/year
Interest 6% x $\frac{(\$180.40 + \$127.00)}{2}$	= \$ 9.22/year
Insurance @ \$1.50/\$100.00	= \$ 2.30/year
Total Investment Cost	\$22.20/year

Cow Losses

at 2% of replacement value	
2% x \$180.40	= \$3.61/year

SPACE REQUIREMENTS PER COW

<u>Area Required*</u> <u>Per Cow</u>	<u>Capital Cost*</u> <u>Per Unit</u> <u>Area</u>	<u>Capital</u> <u>Investment</u> <u>Per Cow</u>	<u>Depreciation**</u> <u>Life</u>	<u>Capital</u> <u>Cost</u> <u>Per Cow</u>	<u>Interest</u> <u>Per Cow</u> <u>@ 6%/Yr.</u>	<u>Insurance***</u> <u>@ 1%</u>	<u>Total Cost</u> <u>Per Cow</u> <u>Per Year</u>
30 sq. ft.	\$1.25/sq. ft.	37.50/cow	10 yrs. or 10 cows	\$3.75/cow	1.13	.37	\$5.25

* "Farm Buildings' Standards - Canada 1965"

Supplement number 6 to the National Building Code

Publication number 7909 - National Research Council

** Buildings are generally depreciated at 5% per year or spread over 20 years. However, since credit for buildings cannot be attained for more than 10 years, it is more realistic for the depreciation cost to be paid in 10 years and the value at the end of the 10 year term added to the operator's net worth.

*** Based on a general rate for "out buildings" used by insurance companies.

Breeding Cost Per Cow

Value of 2-3 yr. old bull	= \$500.00
Plus freight from Edmonton	13.00
	<hr/>
	\$513.00
Value of old bull sold at	
\$.16/100 lbs. and 1800 lbs.	288.00
Less freight to Edmonton	23.40
	<hr/>
	\$264.60

<u>Depreciation</u>	$\frac{\$513.00 - \$264.60}{2}$	=	\$124.20/year
<u>Interest</u> 6% x $\frac{513.00 + 264.60}{2}$		=	23.32/year
<u>Insurance</u> @ 1.5%	= 1.5\$ x 513.00	=	7.70/year
<u>Losses</u> @ 2% x \$153			10.26/year
<u>Feed</u> Alfalfa-Brome 2.9 tons x \$8.01/ton	=		17.54/year
Mixed Grain 2.33 tons x \$6.18/ton	=		14.40/year
<u>Vet & Medicine</u>			2.20
<u>Millfeed</u>			2.45
			<hr/>
Total Cost/Year			\$202.07

Cost/Cow @ 35 cow/bull/year $\frac{\$202.07}{35} = \5.77

FEED COST/COW

Hay Costs

It is assumed that there is no market for hay in the area and therefore no alternative charge can be placed against the hay on the basis of its market value. The only costs then, are the costs involved in producing the hay. The following is a breakdown of the cost factors involved. The detail of each cost factor is provided in following pages.

	<u>Alfalfa-Brome</u>	<u>Mixed Grain</u>
Seed	\$1.37	\$.85
Machinery	3.18	3.08
Land* at \$5.17/acre/yr.	3.46	2.25
Total	<u>\$8.01</u>	<u>\$6.18</u>

* Same as $\frac{1}{4}$ crop share would be on total acreage if it were growing grain.

Cost/Cow (Assuming all of the hay is feed minus the amount used by bulls.)

Alfalfa Brome (594.0 tons - 13.14 x 6 tons) x \$8.01 \div 280 = \$16.62

Mixed Grain (607.2 tons - 13.98 tons) x \$6.18 \div 280 = \$13.09

MACHINE COSTS PER TON OF HAY

<u>Machine</u>	<u>Alfalfa-Brome</u>		<u>Mixed Grain Hay</u>	
	<u>Hours</u>	<u>Total Cost</u>	<u>Hours</u>	<u>Total Cost</u>
Deep Tiller	74	57.72	100	78.00
Diskers	23	58.65	46	117.30
Harrows	30	29.40	40	39.20
Seed Drill	25	68.25	50	136.50
Swather	129	187.05	44	63.80
Crimper	129	123.84	44	42.24
Stack Mover	85	269.45	87	275.79
Hay Basket	85	32.30	87	33.06
Push Off	85	16.15	87	16.53
Grapple Fork	59	9.44	61	9.76
Loader	144	169.92	148	174.64
Tractor	510	841.50	515	849.75
Stack Cages	85	27.20	87	27.84
Total		<u>\$1,890.87</u>		<u>\$1,864.41</u>
Cost/Ton	$\frac{\$1,890.87}{594}$	= \$3.18	$\frac{\$1,864.41}{607.2}$	= \$3.08

Hourly Machine Cost Rates for Hay Production

<u>Machine</u>	<u>Work Rate</u>	<u>Total Hours</u>		<u>Cost/Hour</u>
14' Deep Tiller*	5.4 Acres/Hr.	174	174	\$.78
15' Disk*	5.8 Acres/Hr.	69	69	2.55
30' Harrows*	14.5 Acres/Hr.	70	70	.98
14' Seeder	5.4 Acres/Hr.	75	75	2.73
16' Swather*	6.2 Acres/Hr.	173	173	1.45
Crimper*	6.2 Acres/Hr.	173		.96
Stack Cages**		172		.32
Stack Mover**	7 Tons/Hr.	172	172	3.17
Hay Basket**	7 Tons/Hr.	172	172	.38
Push Off**	7 Tons/Hr.	172		.19
Grapple Fork**	1 Ton/Hr.	120	120	.16
Manure Fork**	8.4 Tons/Hr.	182	182	.16
Snow Bucket**		50	<u>50</u>	.37
Loader**		524	524	1.18
Manure Spreader*	8.4 Tons/Hr.	182		1.02
50-65 H.P. Diesel* Tractor			<u>1,257</u>	1.65

* Costs derived using method in "Farm Machine Rates - Alberta"
- Alberta Dept. of Agriculture

** "Agricultural Machinery Costs" - Canada Dept. of Agriculture
Publication 1291 - 1966

MACHINE COSTS/SPECIALIZED EQUIPMENT

	<u>Interest</u>	<u>Depreciation</u>	<u>Repairs</u>	<u>Insurance & Housing</u>	<u>Total</u>
Hay Basket	.03 (326 + 32.60) = 10.76/yr. = .07/hr.	$\frac{326}{2000} = .16$	@ 75% .12/hr.	@ 1½% .015 (326) 172 = .03	.38/hr.
Push Off	.03 ($\frac{152 + 15.20}{172}$) = .03/hr.	$\frac{152}{2000} = .08$.06/hr.	.015 (152) 172 = .015/hr.	.19/hr.
Grapple Fork	.03 ($\frac{110 + 11}{120}$) = .03/hr.	$\frac{110}{2000} = .06$.05/hr.	.015 (110) 120 = .015	.16/hr.
Manure Fork	.03 ($\frac{142 + 14.20}{182}$) = .03/hr.	$\frac{142}{2000} = .07$.05/hr.	.015 (142) 182 = .01	.16/hr.
Snow Bucket	= .03 ($\frac{213 + 21.30}{50}$) = .14/hr.	$\frac{213}{2000} = .10$.07/hr.	.015 (213) 50 = .06	.37/hr.
Loader	.03 ($\frac{1225 + 122.50}{524}$) = .08/hr.	$\frac{1225}{2000} = .61$.46/hr.	.015 (1225) = .03 524	1.18/hr.
Stack Mover	.54/hr.	1.40/hr.	.98/hr	.25/hr.	3.17/hr.

MANURE AND SNOW HANDLING COSTS

	<u>Hrs.</u>	<u>Cost</u>
Manure Fork	182	\$ 29.12
Snow Bucket	<u>50</u>	18.50
Loader	232 232	273.76
Manure Spreader	182	185.64
Tractor	232	<u>382.80</u>
Total Cost/Year		\$889.82

$$\text{Cost/Year/Cow} = \frac{\$889.82}{280} = \underline{\underline{\$3.18}}$$

The manure loader and the spreader were used at the same time so that the work rate of each were depended on each and so the number of tractor hours used on one includes the hours used on the other.

TIME REQUIREMENTS FOR FORAGE PRODUCTION

		<u>Acres</u>	<u>Hrs.</u>
Alfalfa-Brome	Swath & Crimp (twice)	132 x 2 = 264	43
Alfalfa-Brome	Swath & Crimp (twice)	132 x 2 = 264	43
Alfalfa-Brome	Swath & Crimp (twice)	132 x 2 = 264	43
	Cultivate (twice)	132 x 2 = 264	49
	Disk	132	23
Mixed Grain	Cultivate	132	25
	Harrow	132	10
	Seed	132	25
	Harrow	132	10
	Swath & Crimp	132	22
	Cultivate	132	25
	Disk	132	23
Mixed Grain	Cultivate	132	25
	Harrow	132	10
	Seed	132	25
	Harrow	132	10
	Swath & Crimp	132	22
	Cultivate	132	25
	Disk	132	23
Seed Down	Cultivate	132	25
	Harrow (twice)	132 x 2 = 264	20
	Seed	132	25
	Harrow	132	10

WORK RATES FOR FORAGE PRODUCTIONGrapple Fork

Assume distance hay moved = 100 feet

or 200 feet return @ 3 mi./hr.

Capacity of fork = 1 ton

Travel Time = 1 minute

Loading and unloading = 5 minutes

6 min./trip

or $\frac{60}{6} = 10$ trips = 10 tons/hr.

Manure Spreader

180 Bushel = 5.6 tons

Distance 1 mile (return)

Speed = 6 mi./hr. = 10 min./5.6 tons

Manure Loader

20 ton/hr. or 15 - 20 min./5.6 tons.

Therefore 1 load loaded and unloaded requires 40 min.

or $1\frac{1}{2}$ loads/hr.

= $5.6 \times 1.5 = 8.4$ tons/hr.

Manure Volume

1 cow on roughage diet produces $\frac{1}{2} - \frac{3}{4}^*$ tons manure per winter month. At $\frac{2}{3}$ tons/cow/month, 286 animals will produce $286 \times \frac{2}{3} \times 8 = 1,525$ tons (includes bedding). Assuming cattle outside in summer months.

* General figure arrived at through consultation with animal dept. -
University of Manitoba - Dr. Seale

SEED COSTS FOR FORAGE PRODUCTION

	<u>Acres</u>	<u>Rate</u>	<u>Seed Cost</u>	<u>Cost/Acre</u>	<u>Cost/Ton Hay</u>
Alfalfa	132	9 Lbs.	\$.55/lb.	\$4.95	
Brome		3 Lbs.	.40/lb.	1.20	$\frac{\$6.15}{*4.5 \text{ Tons}} = \1.37
				\$6.15	
Mixed Grain					
Oats	264	1 Bu.	\$.70/Bu.	\$.70	
Barley		1½ Bu.	\$1.00/Bu.	1.25	$\frac{\$1.95}{2.3 \text{ Tons}} = \$.85$
				\$1.95	

* One seeding lasts 3 years at 1.5 tons/year = 4.5 tons

ANNUAL ALLOWABLE COSTS ON FORESTRY MANAGEMENT UNITS

Management Unit	Annual Allowable Cut Based On		Quota	Buyer
	General Inventory Volume	Detailed Reconnaissance		
F1	1.3 F.B.M.		*	
F2		29.5 F.B.M.	Q1 4.9 FBM Q2 6.0 FBM Q3 8.6 FBM Q4 10.0 FBM	Imperial Lumber Co. Ltd Imperial Lumber Co. Ltd Imperial Lumber Co. Ltd Imperial Lumber Co. Ltd
F3	1.2 F.B.M.		*	
F4	.9 F.B.M.		*	
F5	1.8 F.B.M.		*	
F6	3.8 F.B.M.		*	
F7		3.1 F.B.M.	Q1 3.1 FBM	Riverview Lumber Limite
F8		28.1 F.B.M.	Q1 7.0 FBM Q2 7.0 FBM Q3 6.8 FBM Q4 1.5 FBM Q5 1.9 FBM Q6 2.4 FBM	Imperial Lumber Co. Ltd Swanson Lumber Co. Ltd. Swanson Lumber Co. Ltd. Swanson Lumber Co. Ltd. Imperial Lumber Co. Ltd Swanson Lumber Co. Ltd.
F9		6.6 F.B.M.	Q1 3.0 FBM Q2 3.3 FBM Q3 .3 FBM	Collins Fischer Lumber Ltd. " "
F10	7.8 F.B.M.		*	
F12		20.0 F.B.M.	Q1 7.5 FBM Q2 5.4 FBM Q3 7.1 FBM	Collins Fischer Lumber Ltd. Swanson Lumber Co. Ltd. Swanson Lumber Co. Ltd.
F13	1.3		*	
F14	2.8		*	
F15		10.0	Q1 10.0 FBM	Swanson Lumber Co. Ltd.
F16	.7		*	
F17	1.1		*	
F18	1.1		*	
F19	2.1		*	
F20	0		*	

Source: Rural Development Branch - Alberta Government

* No quotas sold to date (Oct. 1967)

Foot Note: Recent evaluations of the forest inventory suggests that figures based on the inventory could be increased by as much as 50% in some management units to take into account the growth of timber since the inventory was done - Dept. of Forestry, Alta. Gov.

ALL FARMS
RETURN AND COST PER COW WINTERED

ITEM	ENTERPRISE SIZE	Up to 49 Cows Wintered	50 to 99 Cows Wintered	Over 100 Cows Wintered	Average All Sizes
Gross Return		\$ 96.32	\$101.83	\$104.74	\$101.06
Grain		296 lb. 5.20	228 lb. 4.20	205 lb. 3.82	241 lb. 4.37
Millfeed		1.40	1.58	2.34	1.74
Roughage		2.3 T 34.32	1.9 T 30.36	2.0 T 34.28	2.0 T 32.55
Pasture		13.75	14.98	15.58	14.79
Total Feed Cost		\$ 54.67	\$ 51.12	\$ 56.02	\$ 53.45
Veterinary and Medicine		1.58	1.78	1.11	1.54
Direct Variable Cost		1.18	1.69	2.52	1.77
Joint Variable Cost		8.14	7.45	5.38	7.09
Total Variable Cost		\$ 65.57	\$ 62.04	\$ 65.03	\$ 63.85
Insurance and Depreciation		5.16	5.31	5.16	5.23
Interest (Buildings and Equipment)		2.67	2.65	2.44	2.60
Interest (Livestock)		10.13	9.87	11.47	10.38
Total Fixed Cost		\$ 17.96	\$ 17.83	\$ 19.07	\$ 18.21
Labor Cost		10.0 hr. 11.70	8.6 hr. 10.20	5.7 hr. 6.86	8.2 hr. 9.71
Total Production Cost		\$ 95.23	\$ 90.07	\$ 90.96	\$ 91.77
Return over Variable Cost		\$ 30.75	\$ 39.79	\$ 39.71	\$ 37.21
Return to Labor and Management		12.79	21.96	20.64	19.00
Return over Total Cost		1.09	11.76	13.78	9.29
Return to Labor and Management/hr.		\$ 1.28	\$ 2.55	\$ 3.62	\$ 2.32
Return to Investment		5.4 %	9.7 %	10.0 %	8.6 %
Number of farms		48	39	11	98
Cows wintered per farm		34.3	66.5	143.9	59.4
Calf crop weaned		85.8 %	86.5 %	90.6 %	87.4 %
Value per calf weaned		\$107.85	\$113.50	\$111.42	\$111.35
Av. weight per calf weaned		441 lb.	445 lb.	434 lb.	441 lb.
Av. price of calves weaned (per cwt.)		\$ 24.45	\$ 25.48	\$ 25.65	\$ 25.24
Building and Equipment Investment/cow		\$ 53.40	\$ 53.00	\$ 48.80	\$ 52.00
Bldg., Equip. and Lvstk. Invest./cow		\$256.00	\$250.40	\$278.20	\$259.60